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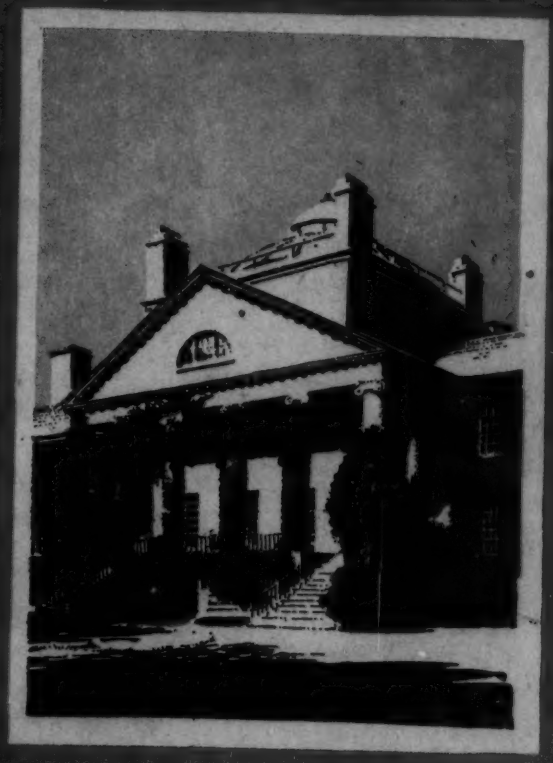

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BOOK DEPARTMENT

CEMENTS, LIMES AND PLASTERS; Their Materials, Manufacture and Properties. By Edwin C. Eckel, C.E. Second Edition, 655 pp. Price $6.50 net. John Wiley & Sons, New York.

SINCE the use of those non-metallic structural materials which are grouped under the broad heading of "cementing materials" is being constantly widened, anything which relates to the materials themselves or to their use is certain to be welcomed by architects and engineers. Under this heading may be included not only the hydraulic cements proper but also a long list of allied materials among which are plasters and lime. With the intensive study which has been given to these materials and to the advances in technology resulting from such study it has become possible to supply them in uniform and higher grades and at prices which are sufficiently low to justify their ever-extending use.

This work is a second edition of Mr. Eckel's volume which appeared in 1905, issued now in a new edition largely because of the changes which have taken place in the production of the materials concerned. In the preparation of this new edition the original work has been revised and partially re-written, and it includes reference lists and statistics necessary to bring the text into accord with current knowledge and practice, while about 100 pages of wholly new matter have been added. Considerable attention has been given to the development of the manufacture of these materials in Canada and foreign countries, and because of the growth in its manufacture the sections dealing with Portland cement have been enlarged and several hundred analyses have been added to cover points of particular importance relating to raw materials and to fuels. The author deals with an intricate and complicated subject in a way which is as non-technical as possible considering the nature of his topic and the fullness with which he treats of the composition and manufacture of these materials. Maps are given upon which are indicated the localities in which gypsum and other deposits necessary for their manufacture are found or at which there have been built mills which form centers of the industry. After dealing with the apparatus required for their manufacture space is devoted to the composition, properties and tests of plaster and other substances intended for different uses. In considering a material which is used in vast quantities in building and engineering of so many kinds, the prices at which it is to be had are highly im-

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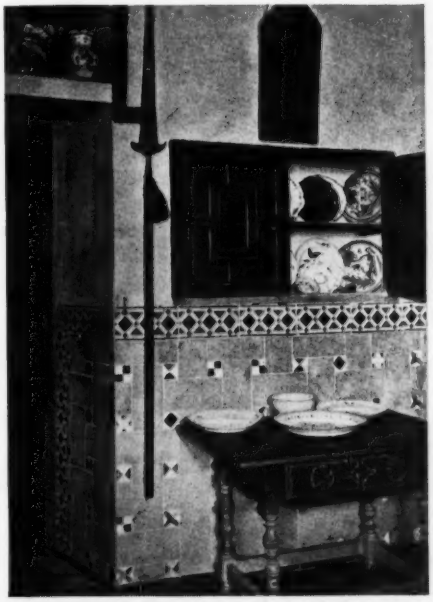

FOR the architect or decorator there is here given a wealth of ideas as to the possibilities of the Spanish style, which are as yet comparatively unknown. The furniture, pottery, tiles, iron work and fabrics which go to making the Spanish interior so unusual are not difficult to secure, and their judicious combination might easily result in an effect out of all proportion to the cost involved. It is almost wholly a matter of tasteful and characteristic arrangement, and much of the skill which is necessary for arranging these effects is to be acquired from these illustrations of actual Spanish homes.

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portant. The prices at which such products are to be purchased depend in large measure upon the costs of other materials, such as fuels of different kinds which enter into the cost of production. Mr. Eckel feels, in view of present conditions, that we shall not get back to the cost level of 1900 for perhaps 20 years, and he doubts if the low level established in 1896 and 1898 will ever return.

This work is perhaps too widely known to require an extended review and still less an estimate as to its value, but it may be said that in this new edition the book possesses every valuable feature of the original with the added value of revision which brings its data into conformity with present-day uses and conditions.

THE DEVELOPMENT OF EMBROIDERY IN AMERICA. By Candace Wheeler. 152 pp., 6¼ x 9½ ins. Price $5 net. Harper & Brothers, New York.

GREAT is the debt which architecture owes to the arts which have contributed to the magnificence of her triumphs, and among these ancillary arts that of needlework takes important rank. The art, as written of here by one long known as a leader in certain kinds of decorative art, includes needlework in a wide variety of forms, from actual embroidery, the word used in the title of the book, to work of such a wholly different nature as tapestry, which since it is wrought upon a loom is more often regarded as belonging to the art of textile weaving. Many of the sub-divisions of needlework which are discussed in these pages have through the centuries been used in connection with interior architecture, and designers well know the value of needlework as hangings, as panels for screens, or as coverings for chairs, stools and sofas.

MODERN FURNITURE DESIGNS ADAPTED FROM THE ENGLISH PERIODS. 46 pp., 16¾ x 11 ins. Price $8. John Tiranti & Co., Tottenham Court road, London, W.

THE interest in architecture, decorating and furnishing of definite periods leads to the use of the various English types many who recognize their suitability for use today, but unfortunately some who approve in principle of the use of period design are unwilling to use such precedent in its integrity and insist upon making certain alterations or "adaptations" in the design which mar, or more frequently ruin, its entire character. One frequently sees in the shops pieces of furniture obviously based upon excellent examples of English, French or Italian furniture of definite periods quite spoiled by some change in the design which the manufacturer evidently thought necessary to insure its popularity, though it may be doubted whether in tinkering with the design and trying to please both those of well grounded taste and those to whom the "popular" appeals he has not missed pleasing either.

In this book there is much to praise in that it contains some patterns of furniture well worthy of reproduction, but the trained designer could hardly be expected to approve of certain patterns in which grave liberties are taken with design of say the Jacobean and Queen Anne periods, liberties taken no doubt with a well meaning desire to elevate the public taste by persuading people to adopt better design. The trouble is that such design is not enough better to make amends for the serious injury done to good taste by the alterations involved, in which period furnishing and decoration suffer.

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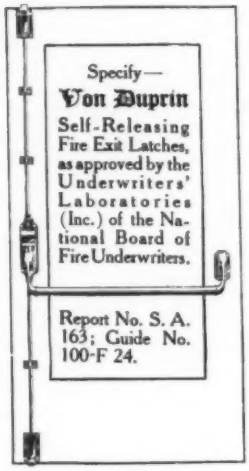
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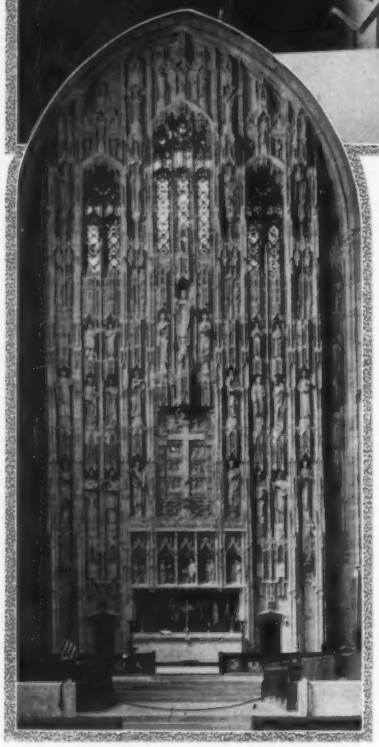

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The ARCHITECTURAL FORUM

VOLUME XXXVII — NUMBER 6

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ALBERT J. MacDONALD, Editor

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THE EDITOR'S FORUM

HOSPITALS AND ARCHITECTS

THE development of this Hospital Reference Number of THE ARCHITECTURAL FORUM necessitated establishing a close contact with many hospital projects, both completed and prospective. This contact brought to light several interesting trends in the hospital field which are of importance in their relation to the profession of architecture.

Perhaps the most interesting fact is that the hospital building has passed forever out of the class of grim, ugly structures representing the dire necessities of communities, and into a class of important institutional buildings requiring definite architectural expression and design. We find today hospitals not only for emergency cases nor alone to meet the necessities of persons of limited means, but providing suitable accommodations for all types of medical and surgical service and for convalescence and recuperation.

The service of the architect is not limited to meeting these requirements, for it has been found that through close co-operation with the hospital officials and with consulting specialists in various types of mechanical and service equipment required in the hospital, the architect is enabled to render an invaluable service in correlating all phases of hospital activity and incorporating these in the planning of the building to produce a structure entirely efficient of purpose. Thus we find architectural organizations often rendering an unusually complete service which involves the selection of all service equipment as well as the materials and mechanical equipment for the building.

In relation to all types of institutional buildings, the service of architects is broadening in its scope. The architect, because of the nature of his profession, is in a position to study any institutional problem from an interesting point of vantage. He can survey the field represented by any class of buildings with a practiced eye and glean from the experience of others valuable practical data to apply to any given problem. He is also in a position to know of the latest developments of structural practice and mechanical installations, so that with the needs of the institution definitely expressed by its directors and officials, he may make valuable suggestions, and often interpret the future of the building in terms of structural preparedness.

Full realization of these facts is rapidly developing in all institutional fields where building requirements are specific and involve large expenditures of money. This broader form of architectural service is in fact creating a definite impression in the business world, and today, as never before, the importance of the architect's position in the economic world is receiving public recognition. There are two reasons for the development of this very desirable condition. The first and by far the more important reason is the acceptance by many architects of the broader responsibilities involved in rendering complete professional service, which includes not only the ability to produce attractive and practical buildings but to thoroughly appreciate the business of the institutional problem of the client and, second, to meet these needs by a well developed advisory service.

It has been said that the future is only history repeating itself, and to read the future of the architectural profession requires only an analysis of past performances. The success which has attended the invaluable service of architects who have given thorough study to institutional needs as evidenced by the hospital buildings and data presented in this issue, constitutes a definite guarantee for the future of all architects who give serious consideration to the specific business and service problems involved in the design and equipment of institutional, commercial and investment structures.

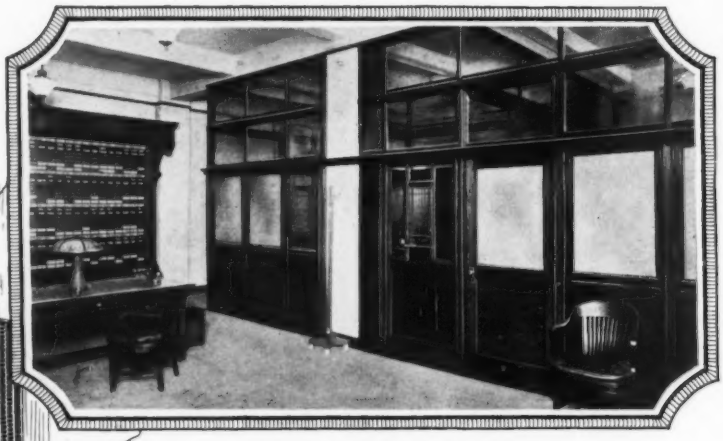
THE FORUM'S 1923 BUILDING SURVEY

THE annual building survey and forecast of THE FORUM has just been completed and will be presented in the January issue. It is interesting to know, however, that the returns on this survey indicate that 1923 will be the greatest building year of history. The hospital field reports indicate that upward of $200,000,000 will be invested in hospitals during the next year. In fact, in all types of institutional buildings strong activity is shown. The reports on industrial buildings indicate continued activity in this field, together with growing requirements for architectural service. Industrial building activity next year will be marked by factors of permanency and structural character in the types of buildings required. Other important building fields reflect great activity in this survey.

CHICAGO TRIBUNE COMPETITION

ANNOUNCEMENT has just been received through press dispatch as follows: John Mead Howells of New York, son of William Dean Howells, novelist, won first prize in the Chicago Tribune's $100,000 competition and thus becomes architect of its new building, to be erected at 431-439 North Michigan boulevard, at a cost of $7,000,000.

His immediate fee is $50,000. Associated with him in preparation of the design was Raymond M. Hood of New York.



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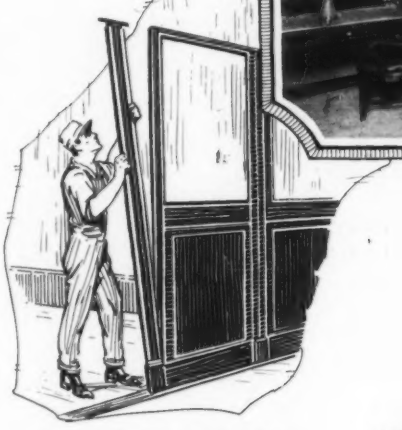

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VOLUME XXXVII DECEMBER 1922 NUMBER 6

Modern Hospital Design

By RICHARD E. SCHMIDT, F.A.I.A.
Richard E. Schmidt, Garden & Martin, Architects, Chicago

THE planning of a hospital should not be begun until its *modus operandi*, present and future, is determined by the medical directors of the institution. The building plan must accord with the operation if it is to be a successful hospital; obviously, it is very difficult, almost impossible, to operate a hospital properly in an unsuitable building.

After the program of the proposed hospital has been framed, the superintendent and a physician who has had hospital experience should co-operate with the architect in developing the building plan in all its details in co-ordination with the plan of operation. If the hospital is to be a large and important structure, the operating engineer should be appointed early during the construction of the building, since it is obviously important that he understand all of the intricacies of the mechanical equipment.

The General Hospital. The scope of the modern hospital of this class is not as broad as its name implies. The general hospital of the middle of the last century accepted patients having any ailment or requiring any medical or surgical service. Today general hospitals, with the possible exception of some of the largest municipal institutions, do not undertake to treat insane, contagious or tubercular patients, or else they are equipped to care for only a limited number of persons suffering from those ailments and for only a few hours or days until they can be transferred to special hospitals. General hospitals furnish medical service for adults and surgical service for adults as well as for children. The majority of general hospitals are not equipped or have very limited accommodations for giving service for the many ailments of childhood. Some obstetrical work is done in almost all of them.

Generally, the reports of past years of existing institutions which are to be enlarged or which are building new hospitals are studied and the subdivisions of the hospital are proportioned to the existing hospital and the number of patients treated therein, much the same way in which the industrial engineer designs a new plant for a going concern. He studies the production for several years, the rate of increase in each kind of product, the totals of costs and receipts to determine the profits in the several divisions, and with the owners decides which are likely to increase in the future and at what rate, and which are so comparatively unprofitable that it is not desirable to provide larger accommodations for them.

The patronage of the hospital in some kinds of cases depends upon the standing and popularity of the medical men in its service. In two hospitals of equal capacity, similarly subdivided, one department will grow at such a rate that it will absorb the space originally intended for another, while in the other hospital the accommodations for the same service will not be overcrowded, and the number of patients per day or year will remain about stationary. Inasmuch as the architect does not control the personnel of the staff and cannot anticipate in what respects it will change, he cannot give much advice regarding the most desirable division of the capacity or what provisions must be made for expansion.

In America the surgical service is developed to the greatest extent in the general hospital, and it manifestly functions in close relationship with many other sections, such as the operating department and the various laboratories. The internal medicine or medical section is of equal importance and makes large demands on the capacity and use of the laboratories and X-ray departments jointly with the surgical section.

Provisions must be made for giving X-ray and radium treatments, and the time may come when it will be necessary to provide equipment for others, such as oxygen or ozone, or pneumatic chambers for all of the forms of light treatment, such as ultraviolet and Finsen, brine, radioactive earth and balsam baths, many of which are used extensively in Europe and in private rest cures and sanitaria in America for the benefit of the wealthy, but which are beyond the reach of the poor. Provisions are made for obstetric and gynecological less frequently than for pediatric, orthopedic, eye, ear, nose and

throat, out-patient and isolation departments, and very rarely for genito-urinary, venereal, dermatological or neurological cases. The public hospitals of large communities must provide for all of these, but not necessarily in one building. A hospital for such a variety of purposes will generally be built on a cottage or pavilion plan. Large laboratories and X-ray rooms are required and will be described more in detail later on.

Hospitals for the Insane. Such hospitals have not been standardized to the same extent as other types, and it is difficult to find many good examples. Only recently mental cases were accorded the same treatment as criminals, *i.e.*, confined in cages and subjected to the gaze of the curious. These old institutions had massive walls and heavily guarded small windows high above the floor; courts surrounded by walls 12 to 15 feet high; no ornaments or flowers, not even benches. The cells, built in rows like an old fashioned menagerie, were closed by massive doors with little peek-holes. It is unnecessary to go into detail in the description of these arrangements, which no enlightened community would permit today, when every mechanical restraint is proscribed. The isolation of patients in cells is resorted to only in extreme emergencies and is prohibited as a regularly applied remedy.

Governmental custodial institutions are often designed for the reception of every category of mental disorder, from the more or less transient cases to the incurable. Unquestionably they should be subdivided for the treatment of the milder cases, chronics, feeble-minded or idiots, epileptics, criminal insane and alcoholics.

Obviously, large asylums should not be near large cities; however it is advisable to have them in the neighborhood of small towns, and consequently there ought to be small receiving hospitals, possibly branches of a general hospital, in large cities for the reception of patients and for the treatment of acute cases which at times can be quickly cured.

It is more economical to have the custody of both sexes at a large institution, inasmuch as it is beneficial to employ the patients whenever possible in some kind of work—the men in the fields, gardens and some of the shops, and the women in kitchens, laundries and sewing rooms. There should be wards for quiet, semi-quiet, noisy and bedridden patients, but no clear-cut division can be made.

No one would advise the construction of large corridor buildings, and almost as rarely the construction of large pavilions. Separate buildings or cottages for a limited number of patients seem to be most favored, and especially an unsymmetrical disposition of the various parts. The monotony of a group of buildings on axis is seemingly too trying for the inmates. The most successful institutions have separate buildings for cooking and feeding, entertainment and gymnastics, infirmaries for bed cases and separate houses or cottages for groups of patients segregated and selected by the medical director. Sometimes pavilions or cottages are connected by covered passages for the convenience of the management and medical staff, but it is best if such connections are few.

The planning of every institution for the insane is such a special problem that it is impossible to attempt to describe it in detail in the limits of this article. Furthermore, the opinions of psychiatrists vary so widely that the medical director should supply the architect with a program for the technique of operation.

Permanent or flowing water baths are such an important element in the quieting of almost every kind of mental disorder that they are especially mentioned. They should be placed in the receiving and every other station.

Contagious Hospitals. In designing a hospital for the treatment of communicable diseases, the principle that such diseases are passed from one person to another by direct contact and are not borne through the air is recognized; however, a hospital arranged just as any other acute disease general hospital is designed, can be used as a hospital for contagious diseases fully as well as a specially designed building if the prevention of cross infection is left entirely to the technical methods employed; but it seems undesirable to do this unless it is in the sole charge of one physician with full-time assistants, graduate nurses retained over long periods, orderlies and maids paid enough to insure their permanent employment.

When this is assured, the technique of treatment should be made obvious, *i.e.*, by physical segregation, by barriers and the almost compulsory use of articles which indicate their intended function to compel attendants to perform certain duties. A room, fixture or article is provided for every step. Arrangements should be made by which the physician, patient or nurse may clean up and leave the premises without carrying any of the elements of infection. The building should be divided into units which can be entered without passing through another, and each such unit should comprise one or more single-bed rooms and one or more small wards, patients' bath, toilet room, nurses' room, nurses' bath and toilet, pantry or kitchen and sterilizing rooms. These units should be so grouped that two or more can be joined into one unit for treatment of one disease.

Food, laundry, heating and other service will be furnished from central plants, and provisions must be made to sterilize linens, dishes, garbage and other things before they leave the building. Some of this can be done by submerging the articles in tanks containing disinfecting solutions. Provisions must be made for change of clothing by the physician after the examination of every patient, and for bathing before leaving the building.*

Tuberculosis Hospitals. The limits of this article

* The article on "Hospitals for Communicable Diseases," published in *Modern Hospital*, March, 1918, by the writer, illustrates a number of plans designed on these principles.

permit of mentioning only a few salient points. After the general requirements of topographical features, shelter from prevailing winds, climatic conditions, water and power supply, soil and drainage facilities have been determined, the preparation of plans can be begun. These have been standardized by the National Association for the Study and Prevention of Tuberculosis and the U. S. Public Health Service. It is important that any natural beauties of site be preserved in laying out the building scheme, since pleasant surroundings are undoubtedly a factor in the treatment of tuberculosis patients because of its tedious nature.

The patients must be protected from prevailing disagreeable winds by rising ground behind buildings to the north, or by belts of trees, preferably evergreens. Patients' buildings should face a little to the east of south in the colder zones. There must be quarters for acute, semi-ambulant and ambulant cases respectively, as well as for all of the services. In small institutions, they are often provided for in two or three buildings. Assembly or recreation hall and rooms for occupational and prevocational therapy are required in a modern sanitarium.

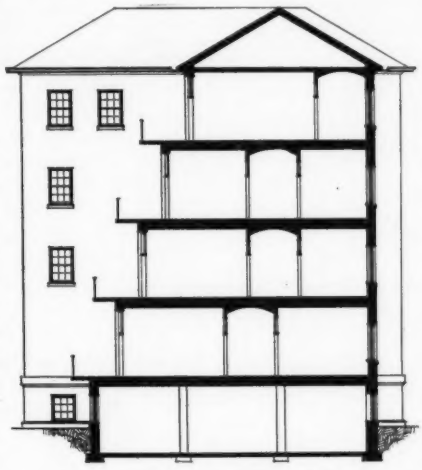


Fig. 1. Cross Section, "Das Feilufthaus"
D. Sarason, Designer

Acutely ill patients are housed in the hospital or infirmary, and as their conditions improve they are transferred to the semi-ambulant building, and later to the ambulant as they progress towards recovery, finally being housed in still more separate quarters. The passing from one building to another has an improving psychological effect on the patient. The accommodations provided for hospital patients in modern sanitaria differ but little from those of the modern general hospital, the chief difference being that for at least 50 per cent of the patients provisions should be made for open air sleeping on porches.

The buildings for ambulant patients should not be designed on the open ward principle, but should be arranged to give some privacy to the inmates.

It is well to arrange a receiving ward or wing in the hospital building, in which newly admitted patients can be observed in bed for a week or two for diagnosis and classification.

"*Das feilufthaus*," literally translated as the "open air building," a system devised by Dr. D. Sarason of Berlin, is an interesting development of buildings of permanent construction for the treatment of tuberculosis patients on sites of limited areas. The cross section, Fig. 1, illustrates Dr. Sarason's system.

Obstetrical Hospitals. A modern maternity hospital is almost as complicated as the most complete general hospital and is not the simple lodging house generally pictured by the uninformed.

Notwithstanding that the danger of infection with which medical and surgical wards of general hospitals menace a maternity department does not exist in a maternity hospital, there will be infected cases which must be isolated by architectural and administrative methods which will reduce the danger to a minimum. Entering cases should be taken to an admitting room for observation. Frankly suspicious cases should go to an isolation pavilion which should be built and equipped very much like a contagious hospital. Slightly doubtful cases should be delivered in an adjoining room, and non-suspicious cases in the main delivery rooms. If, in the main department, mothers and babies develop infectious symptoms, they should at once be removed to the observation department, or if it is serious to the isolation building. A room for individual incubators with separate filtered air intakes and exhaust fans, also a room for "graduates" of the incubators, are necessities. Insulated, temperature and humidity regulated incubation wards or *couveuses* would seem to afford more satisfactory conditions than individual portable incubators, but certainty of proper results does not appear to be assured.

In addition to the usual teaching rooms, the nurses' training department should have a manikin room for the teaching of operative obstetrics on a rubber figure, and an X-ray laboratory, mainly for picture work.

Surgical Hospitals. In the surgical hospital it is possible to arrange the various parts in a much more suitable order for efficient and scientific technique than it is in a general hospital, in which many of the parts must be used by a number of departments or services. The X-ray, microscopic, chemical and other laboratories can be placed in juxtaposition to the operating rooms, as well as the plaster rooms and the machines for muscular re-education. The surgical dressing rooms, and in fact the rooms and apparatus for every activity of the surgeon, can be in one pavilion or inside of four walls, completely segregated from the ward or nursing rooms. Every known method, instrument or performance which is required for a successful operation can be placed at the side of the operator for immediate employment.

Surgeons are not unanimous regarding the placing of groups of surgical dressing rooms adjacent to the operating departments or of distributing these on the ward floors, or as to whether the scrub-up work

and anesthetizing should be done in the operating rooms or in special rooms. Central water sterilizing plants are operating satisfactorily in some institutions and have been abandoned in others; in a few large hospitals surgical dressings are prepared and sterilized away from the hurry, bustle and heat of the operating department. Many hospitals salvage and re-sterilize large quantities of used gauze, while others prefer to destroy it in incinerators. The architect must be guided by the surgical staff's preference in these matters.

Only a high tray bath with a flexible spray is useful in an accident or emergency receiving department, which should also have its operating room where its use will not interfere with the ordinary work of the hospital or provide distraction to disturb the regular patients.

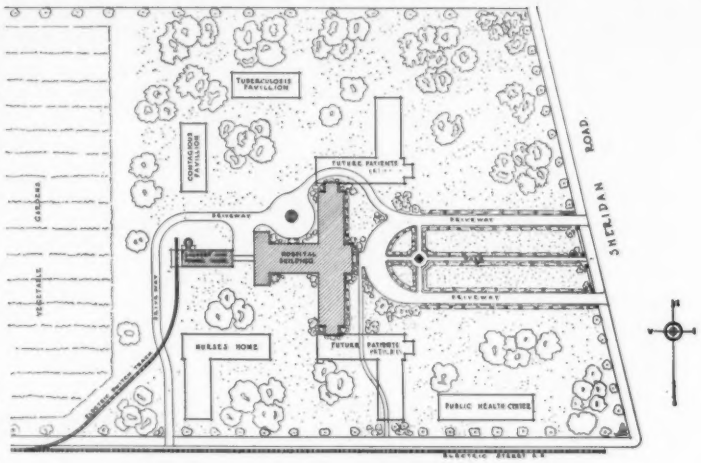


Fig. 2. Plot Plan, Victory Memorial Hospital, Waukegan, Ill.
Richard E. Schmidt, Garden & Martin, Architects

Children's Hospitals. In the case of the children's hospital it seems more necessary than in any other kind that it be readily accessible to the friends and relatives of the patients by cheap means of transportation. It is equally manifest that children's hospitals should be surrounded by the most pleasant conditions and not by industries or railways. Grounds and orientation should permit of many open and enclosed porches in close proximity to the wards. The danger of contagion and cross infection among children must be guarded against from the entrance of the hospital, the reception rooms and every other room. The auxiliary rooms which they do not frequent are in general similar to those required for general hospitals.

New patients are placed in observation or isolation wards until the periods of incubation of various children's diseases have passed. In these and other wards the patients are separated by glazed partitions. The resulting small areas are generally termed "boxes" or "cubicles." These partitions are usually only about 7 feet high and do not extend to the floor. Lavatories should be numerous, so close to each cubicle that physicians and nurses can wash their hands without delay after leaving a child. In some hospitals every cubicle has a complete equipment for use only in that cubicle by the physician, the nurse and the patient; one cabinet for the physician's, one for the nurse's and another for the patient's articles, and every article bears the number of the cubicle.

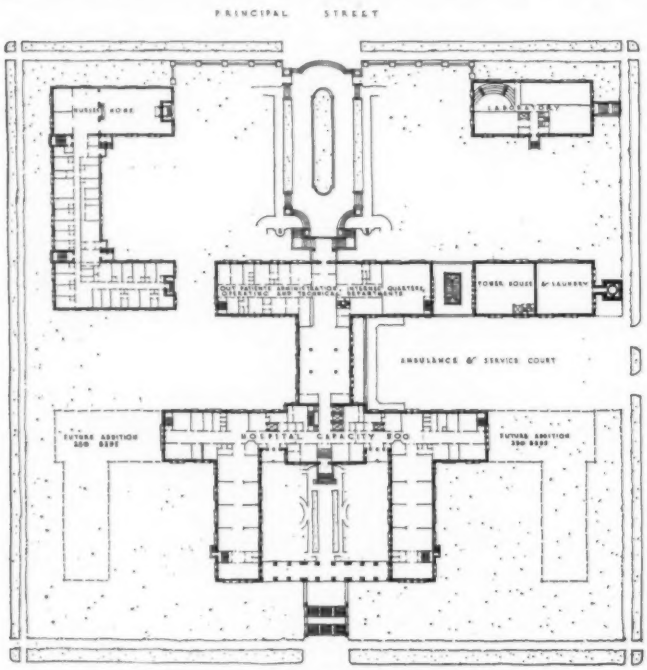


Fig. 3. A 500-bed Municipal Hospital
Designed for ultimate capacity of 1,000 beds
Richard E. Schmidt, Garden & Martin, Architects

Children's beds vary in size from 2 feet by 3 feet 8 inches to 3 feet by 6 feet and larger. The *bassinets* in creches for nurslings are generally about 14 inches by 24 inches or 15 inches by 30 inches; however, they are also made in much larger sizes.

If there are no ordinary private rooms, a quiet room should be arranged in connection with every ward for the use of very sick children; there should be pleasant rooms with all the accommodations of a dwelling for the wet nurses, and a separate nursery for their children.

Porches and solaria should be divided from the wards by French windows to permit rolling beds from one to the other. Roof wards for sun and air treatment are very desirable on hospitals in congested districts, but wherever location and ground area will permit it

seems better to build low buildings and paved, awninged and screened terraces in a garden.

A roomy photographic gallery is valuable for increasing scientific knowledge. If there is a clinic or lecture hall attached to the hospital it is best that there be a separate entrance for students and two entrances for patients, one of these for children with communicable diseases. There should also be preparation rooms for the children in connection with the lecture halls.

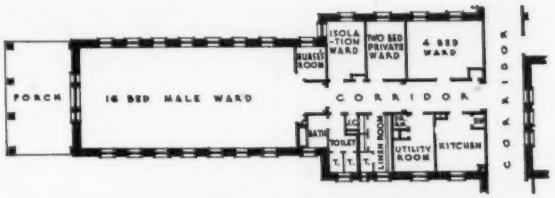


Fig. 4. A Ward Pavilion; 80 sq. ft. per Bed in Ward; 155 sq. ft. per Patient in Pavilion

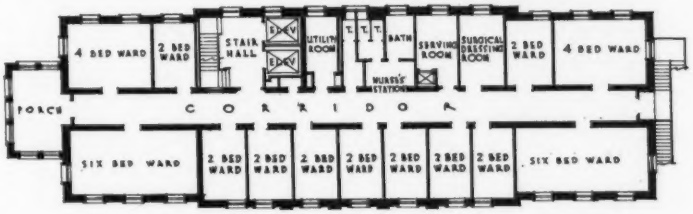


Fig. 5. A Mixed Ward and Room Unit; 80 sq. ft. per Bed in Wards; 157 sq. ft. per Patient in Rooms

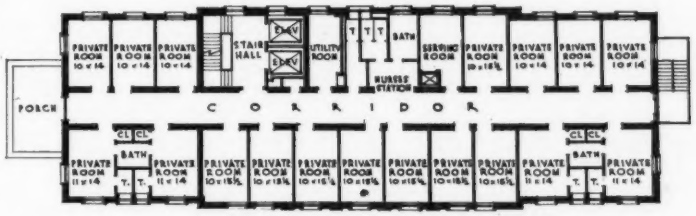


Fig. 6. A Floor of Private Rooms with Common Auxiliary Rooms; Effective Areas 140 sq. ft. and 155 sq. ft.; 267 sq. ft. per Patient per Floor

Plot Planning and Provisions for Future Growth. Notwithstanding that the founders of a hospital may believe that the institution they propose to build will serve the community and fill all of the requirements that the science of medicine may require for many years, it is obvious that it would be unwise to build without preparing a rough study of the ultimate possibilities of the entire site or of land which it may seem reasonably possible to acquire in the future, adjacent to the site (Figs. 2 and 3). It will not be necessary to develop elevations and details or attempt to anticipate the advances in medical science which will unquestionably occur, but only to prepare a scheme with properly oriented buildings having convenient circulation, each building of adequate size to provide the auxiliaries and services in their proper proportion as known today, also space for the enlargement of the housekeeping services, such as the heating plant, kitchen and laundry, and the enlargement of the administration, operating and laboratory facilities from time to time as the buildings designed for future construction are erected.

It is necessary to remember that some of these departments cannot be enlarged but will have to be converted for other uses, and it would be better to design for perfect functioning in the completed plan than it is to do this in the first portion to be built if it is not possible to do both. Because of this, comparatively small kitchen, laundry and heating units may be placed in the first unit or in inexpensive additions, and moved to separate buildings when the use of these services is greater than their original or temporary dimensions will permit; but as in many other elements, every problem cannot be solved on the basis of the same principles. Low buildings, high buildings, city and country institutions, present varying problems and solutions. The space occupied by wards in the first unit can easily be converted into private rooms or *vice versa*. Ward buildings, private buildings, obstetrical, children's, and buildings for other special purposes can be added from time to time when the portions of the original unit used for these purposes are crowded beyond their capacity, but the possibility of converting some parts of the original units to other uses should be studied during the preparation of the original drawings, notwithstanding that no one can anticipate which department will first crowd its limits.

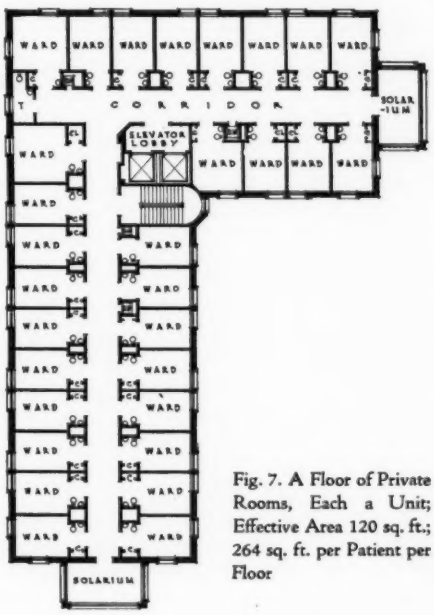


Fig. 7. A Floor of Private Rooms, Each a Unit; Effective Area 120 sq. ft.; 264 sq. ft. per Patient per Floor

Private Rooms versus Wards. It cannot be denied that ward service can be furnished at a lower cost than private room service, or that the cost per bed is less for ward beds than it is

Doctors' Lounge and Library, Evanston Hospital, Evanston, Ill.
Richard E. Schmidt, Garden & Martin, Architects

for beds in single or private rooms (Fig. 4). One nurse can provide good service for eight or ten ward patients, all of whom she can observe while in the ward. Patients can ask for water, utensils or other things, and they can be furnished with the least loss of time, but when every patient is in a single-bed room the nurse will be within the sound of the voice of only one patient at a time, and she cannot render the same service to as many different rooms as there may be beds in a ward (Fig. 5). Obviously, the cost of a hospital consisting wholly of private rooms would increase in a greater ratio than the simple proportion of the larger cubic contents of that kind of a hospital to the contents of a hospital in which all of the patients are in wards (Fig. 6). Pantries, duty rooms and other auxiliaries required for proper technique can be grouped closer on the average to each bed in a ward than they can to the same number of beds in private rooms, which is another factor which increases the cost of services.

Every hospital should furnish service to any good citizen who applies, no matter what station he may occupy, but as patients' means are not alike, the poor cannot be expected to pay the same charge as the rich; at least our customs do not permit charges of different amounts for identical accommodations and service.

While the service is practically the same, well-to-do and rich patients are given better accommodations and are for that reason perfectly willing to pay high enough rates to leave an excess over the actual cost of the service furnished to them, which excess usually covers the loss suffered by the hospital in giving accommodations and service to poor patients for no charge or at a charge below actual cost. Therefore, there appears to be ample reason for providing wards notwithstanding that it is ideal to give every patient a private room and afford him the quiet and privacy of that arrangement.

However, private rooms can be arranged to have every auxiliary service, making each room a complete unit with all of the equipment usually provided for a unit of rooms (Fig. 7). Each room can have a water closet with a swinging water spout to function as a slop sink, a bath tub or shower, lavatory, medicine case, bedpan rack, refrigerator for food or specimens, cabinet for extra linen, clothing, private porch, etc., either connected to a service story or basement by dumbwaiter or by one dumbwaiter in common with two or more rooms, by means of which food and other things which it may be more advisable to prepare or store in a central place can be delivered, but it needs no argument to appreciate that that kind of a building will cost considerably more per unit than one of the more ordinary types in which many of the auxiliaries mentioned are provided in separate rooms or spaces for a group of private rooms.

Plumbing Changes and Simplification. Very few, if any, new types of plumbing fixtures have appeared recently. Possibly more fixtures have been made for wall hanging to eliminate supporting legs. This change with the growing use of materials for pipes and cocks which do not require polishing and the elimination of concealed overflow channels above the trap water line are the principal changes. As a whole the tendency is to simplify fixtures. Inasmuch as bath tubs are almost useless in a hospital, shower baths are taking their place as being more sanitary and space-saving; furthermore, they seem to the wealthy patient sufficiently desirable to justify the rental of a bathroom.

The cost of repairing floors and walls of fireproof buildings resulting from replacement or repair of pipes is so large that the accessibility of piping is being given much greater attention than formerly. Shafts of fire-resisting materials with metal doors and removable marble floor slabs cost so much more than board panels and floors with wooden covers that it is a serious problem. Large and convenient pipe shafts can be built where plans of the several floors are alike, and piping can be repaired or replaced at a minimum cost; but where the floor plans are not alike and it is necessary to build horizontal passages, the cost is almost prohibitive and the use of brass or other non-corrosive metal or the installation of apparatus for removing the corrosive element from water must be made use of.

Increasing Demand for Laboratories. The hospital has materially widened its scope during recent years, and today instead of being merely a nursing establishment, it is in many instances a center for the study of medical sciences, for promoting research work and for the teaching of medicine, a position which the hospital must logically keep if it is to develop fully its usefulness to the community and to the physician.

The large and important national organizations

of physicians have long recognized that a hospital can be of the greatest help to the individual patient, community and race if a laboratory is used as an instrument of diagnosis and of the follow-up treatment; consequently these organizations have brought much pressure to bear on hospitals to provide well equipped laboratories, not merely to carry out routine urine analyses, but to do bio-chemical work, to make proper metabolic studies, and studies in basal metabolism, nitrogen and carbohydrate balances, as well as to correlate the work of the serological, pathological and bacteriological laboratories.

A proper arrangement for a large hospital should provide for these different departments:

Administration, record room, small reception room for patients, director's laboratory, and a reading room for the staff. A bacteriological laboratory with media and incubator rooms should be provided, and a separate room for serology, or else this may be combined with a bacteriology room or with the bio-chemical laboratory. A sterilizing room, tissue room, pathological museum, animal room, animal operating room, individual research room, a photographing room and dark room. A well lighted and ventilated autopsy room and a morgue should be located conveniently to the laboratories without any inconvenience to the pathologist, his assistants and technicians.

In hospitals connected with teaching institutions an amphitheater autopsy room will be required. The X-ray department, cystoscopic examination, electrocardiograph rooms, and a room for the estimation of basal metabolism and other examinations can be grouped with the laboratories or placed in the same building to great advantage for the complete examination of patients and the efficiency of the staff.

Recent Changes in Food Service. In comparatively small hospitals food can be served directly from the kitchen to patients, palatable and hot, as it is in a family home, but in the development of food service in the hospital it has been found that as the patient capacity increased it was necessary to convey the food from the kitchen to steam tables on the several floors to serve food hot. Notwithstanding that the quality of the food suffered from remaining on steam tables too long, no other method was employed until the introduction in recent years of two new methods. One of these is a development of the original method of serving the food directly from the kitchen to the patient, by providing a large serving room adjacent to the kitchen, installing a separate large automatic dumbwaiter

The Hospitable Lobby of Evanston Hospital, Evanston, Ill.
Richard E. Schmidt, Garden & Martin, Architects

for each floor, and setting up the trays in the serving room in a systematic manner by a large number of people, each one of whom has a particular duty to perform. The trays are set up on carts in the serving room, and a short time before the meal hour every person appears at his station in the serving room and the work is begun by first placing all of the cold food articles on the trays; the carts are moved around the room, the hot dishes being served when the trays or tray carts are otherwise ready to place on the dumbwaiters and be lifted to the respective floors where the nurses are waiting to deliver the trays to their patients. It can be seen that it requires careful oversight, training and considerable essential equipment to insure constant satisfactory functioning of this form of food distribution.

Another form of satisfactory and efficient food distribution requires the use of thoroughly insulated food conveyors or carts by the use of which food, fully as palatable and as hot as it would be if served directly from the ranges, can be served at a long distance from the kitchen and a long time after it has been cooked. These conveyors are arranged to convey food in bulk or on plates in racks; both are made with shelves for soiled dishes, and the bulk food conveyor also has shelves for clean dishes. While it is possible to carry cold and hot food in the same conveyor, it is better to have separate conveyors, for one large enough to carry all that is required of both kinds would be unwieldy.

Food can be served from the bulk conveyors in the wards or at the doors of private rooms, but in doing this the odors of cooking will be spread through the building; it consequently seems to be necessary to compromise and to provide a serving room adjacent to the food cart or freight elevators, in which the food can be transferred from the bulk food conveyors to the trays. While it would be possible to omit the serving rooms altogether, it is probably better to have them and to equip them in the usual manner with refrigerators, sinks, hot plates, dish closets, etc., for night and other special food service, and with coffee and milk urns if the station serves a large number of patients.

Efficient food conveyors or carts are built on the principle of the fireless cooker, in which the flavor of the food is conserved and not dissipated; consequently they furnish a more satisfactory service than steam tables.

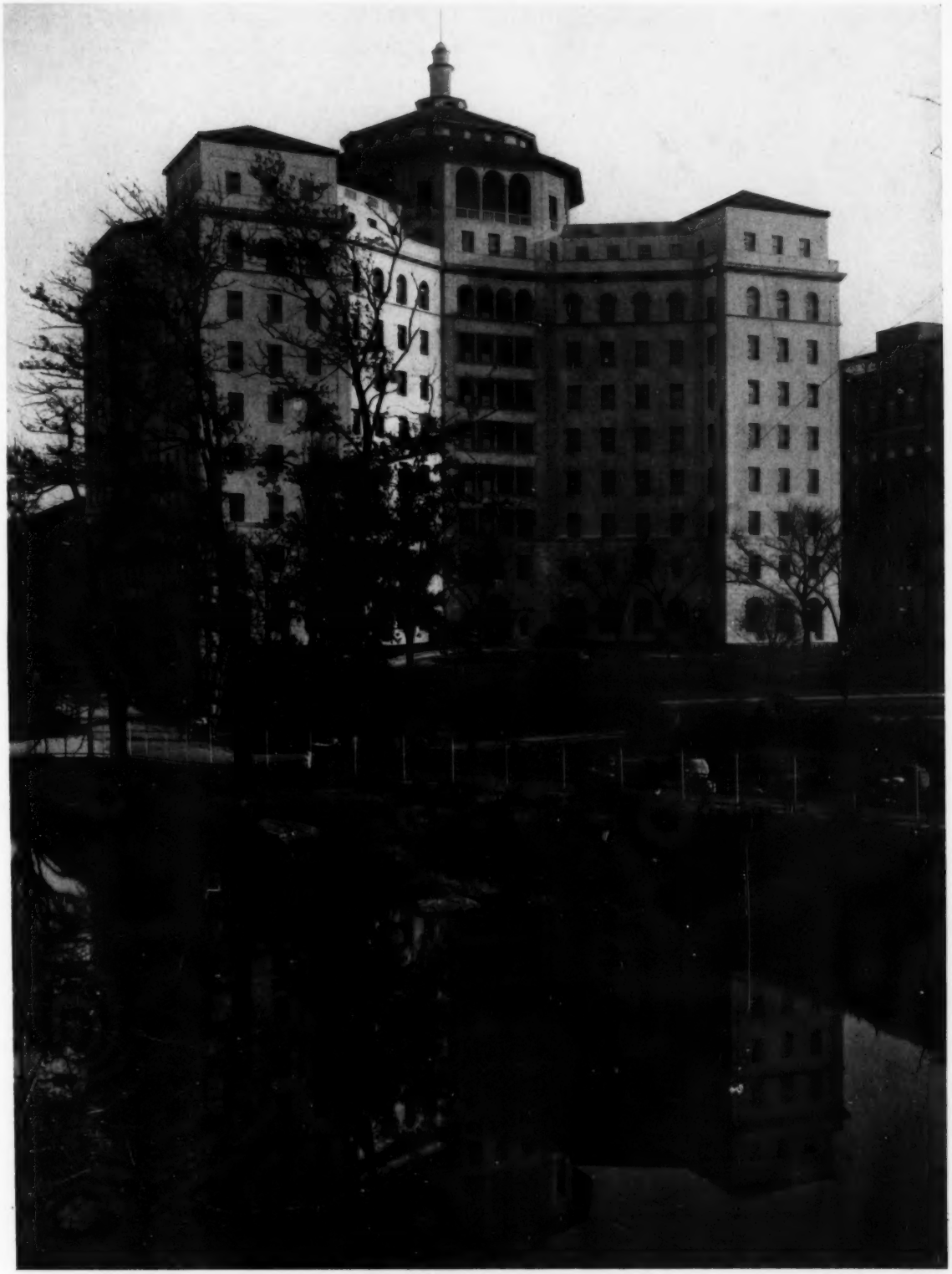
Hotel Atmosphere in Public Rooms. A proper mental attitude of the patient was hardly possible in the older forms of hospitals which resembled correctional institutions, and it cannot be questioned that patients will be more cheerful, looking forward to the success of operations with more certainty, and benefiting greatly if everything they see about a hospital is familiar and inviting, rather than calculated to arouse curiosity and possibly fear. Many discerning hospital administrators have not been slow to appreciate the desirability of making their institutions attractive to the eyes and minds of the patients, and have happily compromised between the most rigid simplicity and the details of hotel and house finish and decoration. It may cost a little more to clean a projecting architrave and panel work than it does the institutional flush casings of doorways, or to use flat paints than it does glossy enamel, but the results in the quick recovery of patients seem to be worth the additional expense.

The entrance, reception rooms, parlors and porches for convalescing patients, for receiving their relatives and friends, should be furnished with as much care as is used in the best hotels and residences. In very large hospitals, parlors for the reception of friends and relatives should be convenient of access to every convalescent, and the cost of replacing the more delicate furniture required for the kind of furnishings mentioned should be considered a necessary expense.

Better Provisions for Nurses and Staff. The very low ratio of non-employment in this country in the past three or four years has made it increasingly difficult to attract women to the profession of nursing. Due to this, and also because it is only common justice, it is desirable to provide proper and adequate accommodations for the nurses, internes, orderlies and other employes of the hospital. Many hospitals are built with little thought of the number of nurses which will be required or the accommodation they should have, and when the hospital is built and completed there is generally not sufficient money available to build a proper nurses' home, and they are lodged in rented quarters, obviously unsuitable, and fed in unattractive, cramped basement dining rooms. Manifestly every estimate of the cost of a hospital should include the cost of a proper building for the nurses, with social, reception and dining rooms, sewing room and laundry where they can do a little of that kind of work when necessary, also a sitting room in connection with each group of sleeping rooms where the nurses can relax before retiring.

It seems to be the consensus of opinion among superintendents of nurses that single-bed rooms are more desirable than two-bed rooms, though possibly some nurses may suffer less from nostalgia during their freshman years if they have roommates. If the hospital can afford them a gymnasium and swimming pool will be appreciated accommodations, and if a training school is combined with the hospital, the teaching rooms, laboratories, diet kitchen and demonstration rooms are better located in the nurses' home than in the hospital proper. The home should be sufficiently removed from the hospital to permit the nurses to relax when off duty, and to enjoy themselves in natural and reasonable pleasures without disturbing the patients in the hospital. The accommodations should be made as nearly as possible like those of a good American home.

The quarters of the superintendent, internes, orderlies and help should be arranged with all reasonable provisions for the comfort of their occupants. Locker and consultation rooms should be

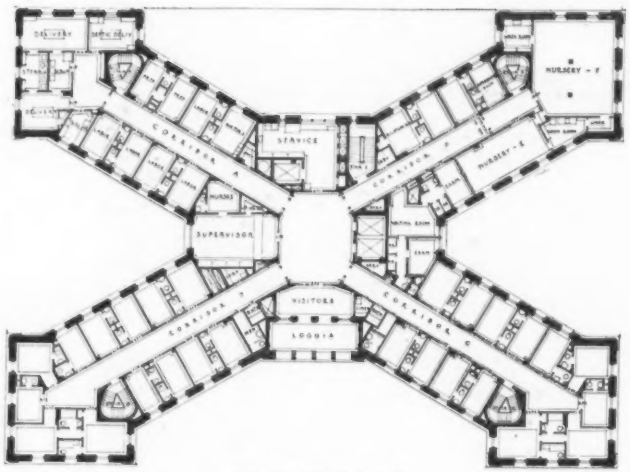


GENERAL VIEW FROM CENTRAL PARK

FIFTH AVENUE HOSPITAL, NEW YORK

YORK & SAWYER, ARCHITECTS

WILEY E. WOODBURY, M.D., CONSULTANT



SIXTH FLOOR PLAN

FIFTH AVENUE HOSPITAL NEW YORK

Illustrations on Plates 89 and 90

Type of construction. Fireproof

Exterior walls. Brick, stuccoed, limestone, terra cotta

Roofs. Tile

Floors. Terrazzo, tile, rubber

Heating. Steam, chiefly direct radiation

Ventilation. Exhaust in certain rooms; minimum forced fresh air supply

Windows. Wood, double-hung, transom sash

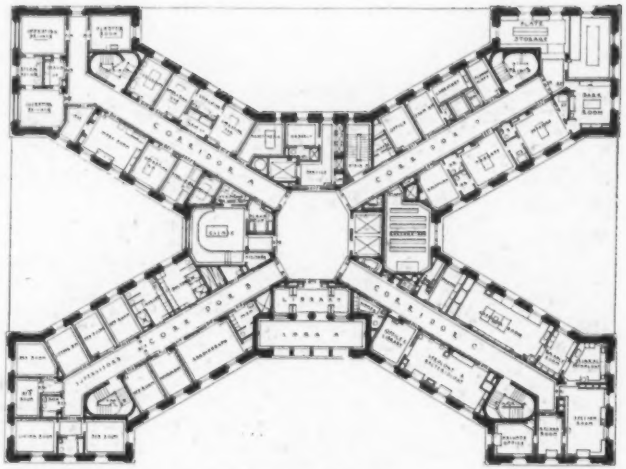
Area of building. Plot 200 x 150

Date of general contract. 1921

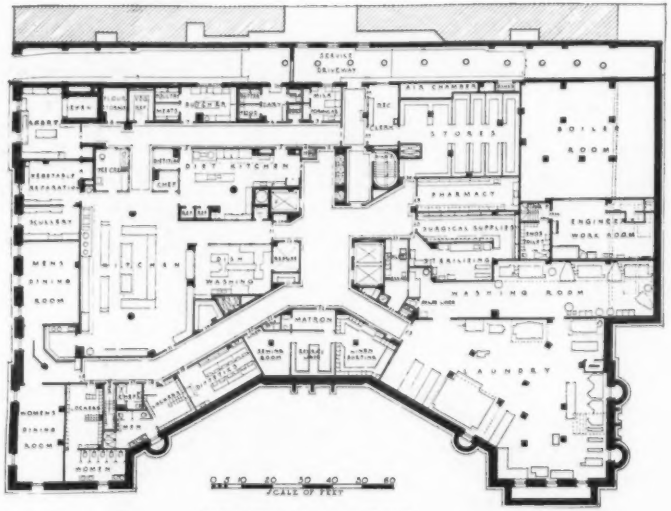
Cost of building proper. $3,000,000

Number of beds. 420

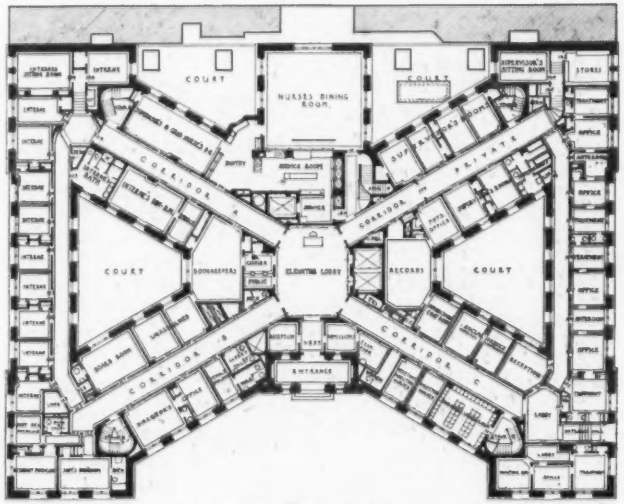
This building is entirely devoted to private rooms and is characterized by centralized service. Nurses' bedrooms, with demonstration and recreation rooms, are on the ninth floor. Boiler room, machinery room and morgue are in the sub-basement.



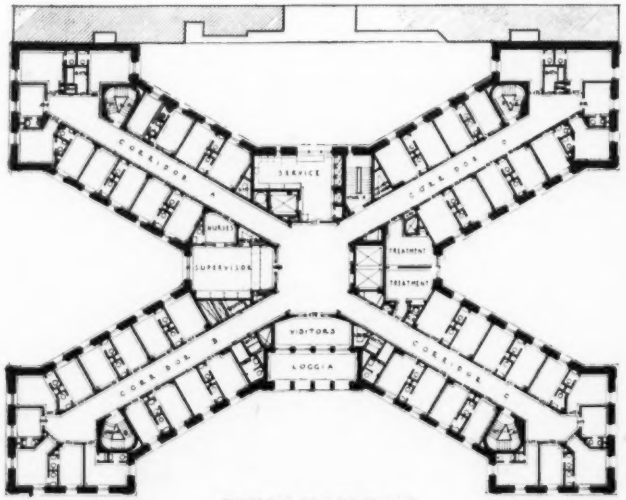
EIGHTH FLOOR PLAN



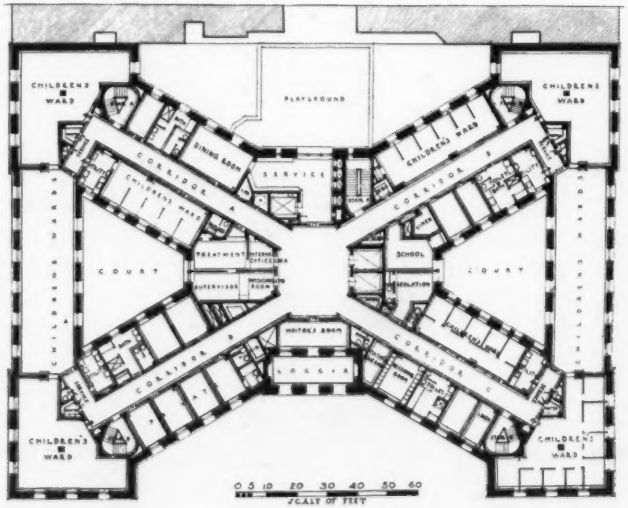
BASEMENT FLOOR PLAN



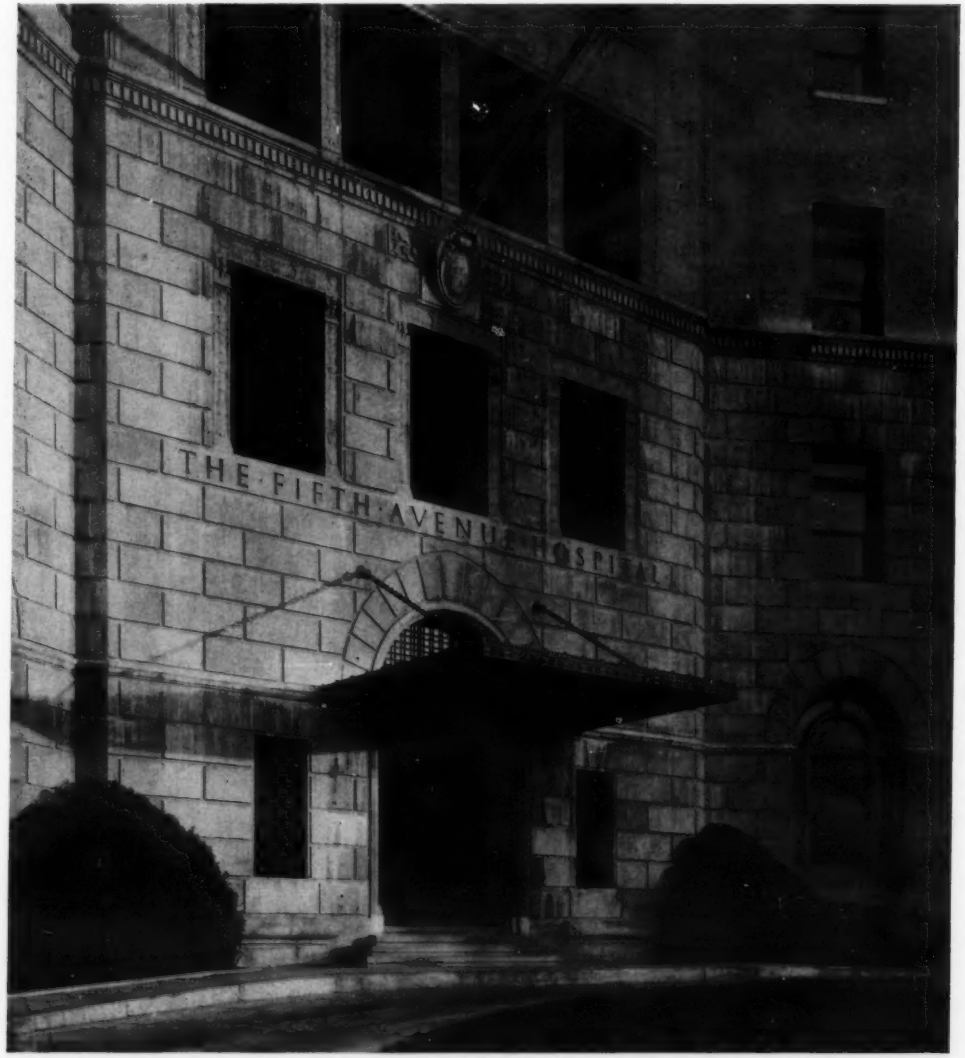
FIRST FLOOR PLAN



TYPICAL FLOOR PLAN



SECOND FLOOR PLAN

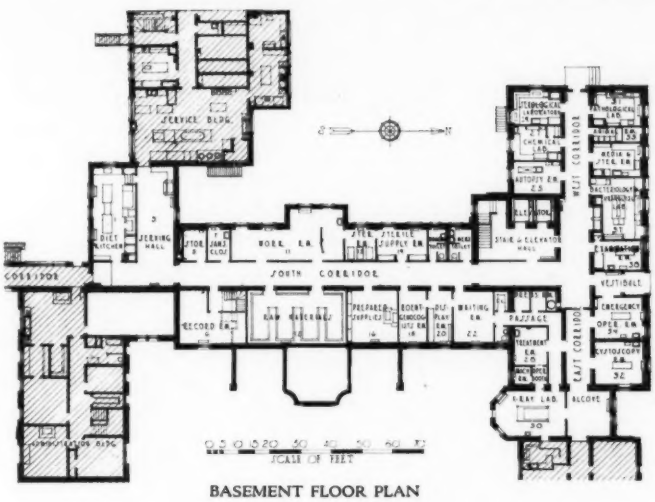


DETAIL OF ENTRANCE

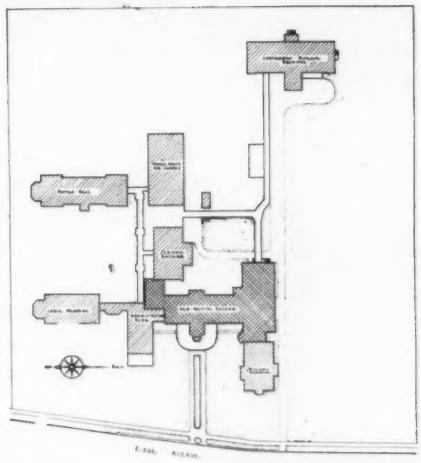
FIFTH AVENUE HOSPITAL, NEW YORK

YORK & SAWYER, ARCHITECTS
WILEY E. WOODBURY, M.D., CONSULTANT

GENERAL VIEW FROM FORECOURT



BASEMENT FLOOR PLAN



PLOT PLAN

ADDITION TO EVANSTON HOSPITAL, EVANSTON, ILL.

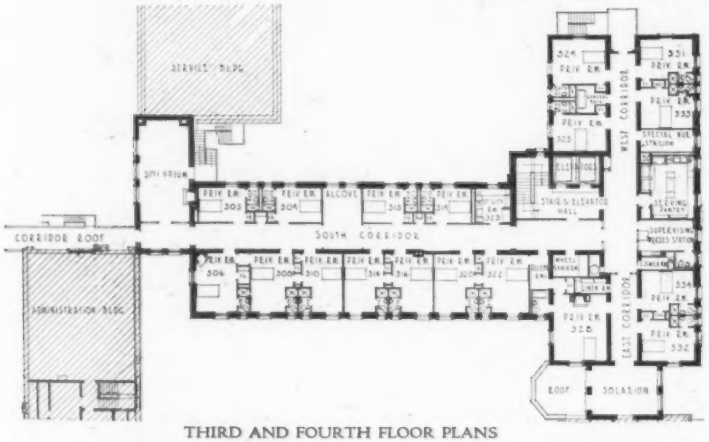
RICHARD E. SCHMIDT, GARDEN & MARTIN, ARCHITECTS

ADDITION TO EVANSTON HOSPITAL
EVANSTON, ILL.

Illustrations on Plates 91 and 92

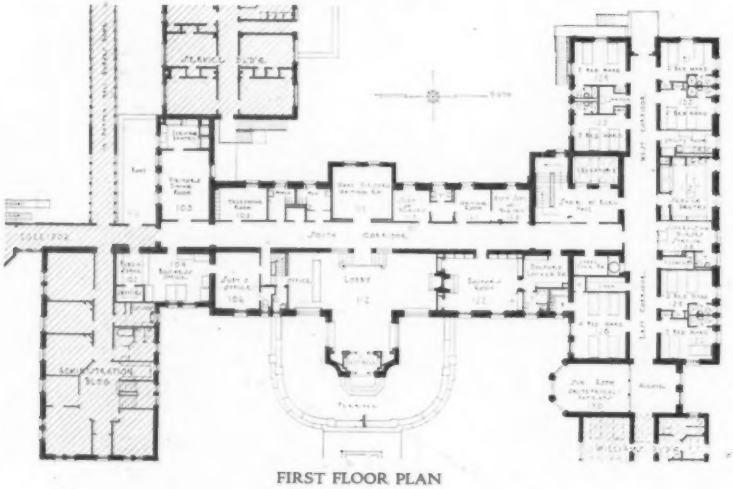
Type of construction. Fireproof
Exterior walls. Concrete, brick facing
Cubage of building. 935,081 cu. ft.
Date of general contract. June, 1919
Cost of building proper. $483,747
Cost per cu. ft. 51¾¢
Number of beds. 80
Cubic ft. per patient. 11,688

This building is largely devoted to private rooms and includes executive departments, operating rooms, laboratories, X-ray, cardiograph and autopsy departments sufficient for a 350-bed hospital. Kitchen, laundry and power plant provided in other buildings.

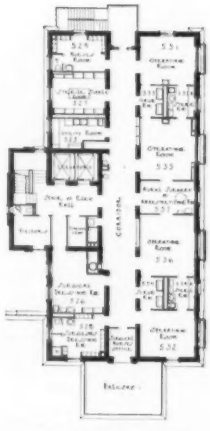


THIRD AND FOURTH FLOOR PLANS

SECOND FLOOR PLAN

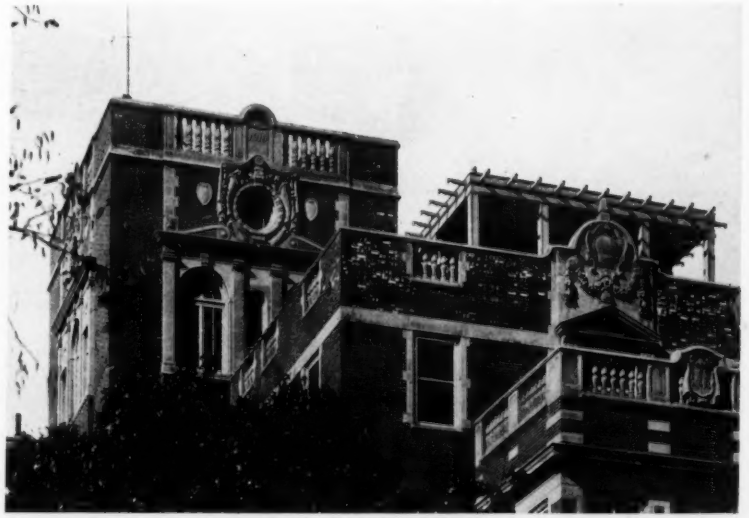


FIRST FLOOR PLAN



FIFTH FLOOR PLAN

OPERATING ROOM SIDE

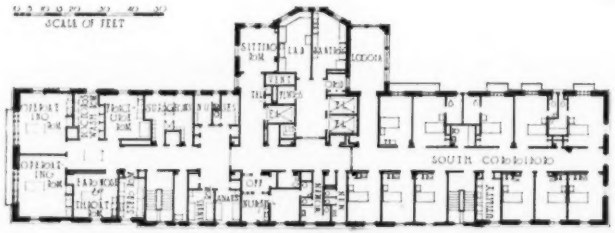


DETAIL OF UPPER STORIES

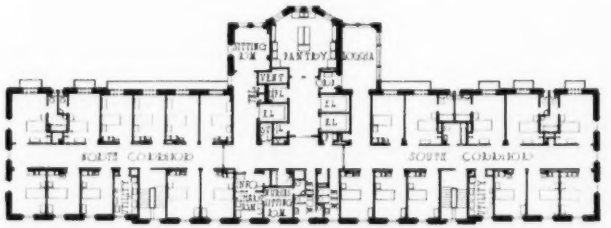
DETAIL OF ENTRANCE

ADDITION TO EVANSTON HOSPITAL, EVANSTON, ILL.

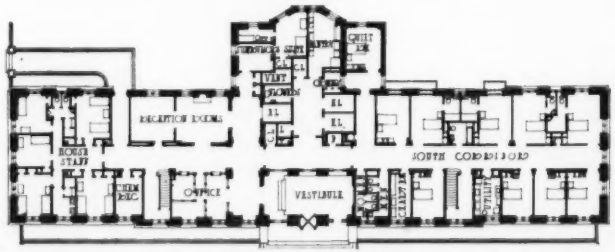
RICHARD E. SCHMIDT, GARDEN & MARTIN, ARCHITECTS



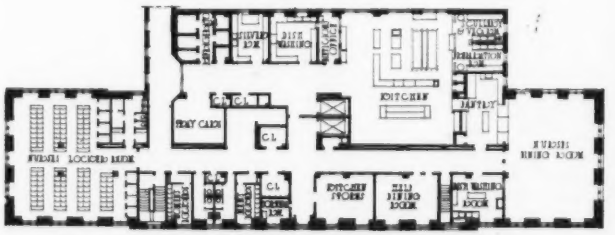
OPERATING ROOM FLOOR PLAN



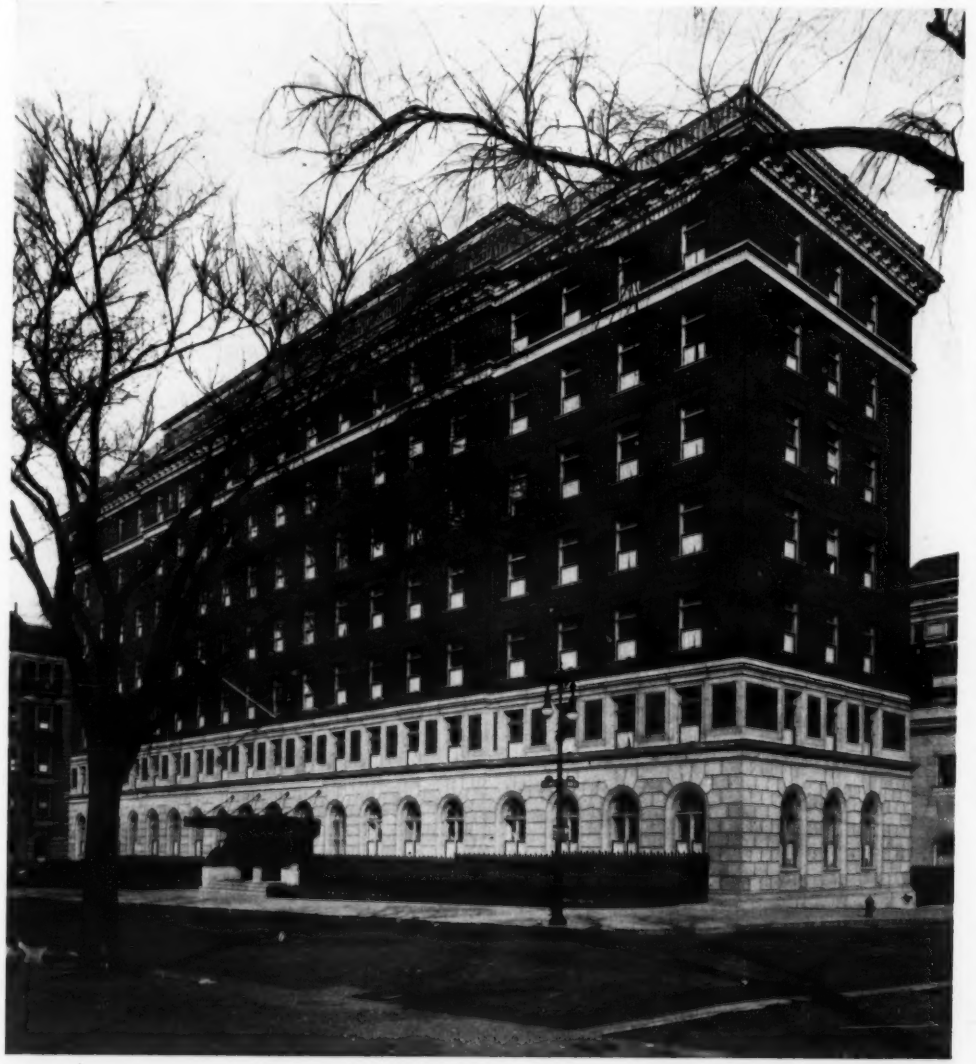
TYPICAL FLOOR PLAN



FIRST FLOOR PLAN



BASEMENT FLOOR PLAN



PRIVATE PATIENTS' PAVILION, MOUNT SINAI HOSPITAL, NEW YORK

ARNOLD W. BRUNNER, ARCHITECT

S. S. GOLDWATER, M.D., CONSULTANT

MOUNT SINAI HOSPITAL
NEW YORK

Illustrations on Plate 93

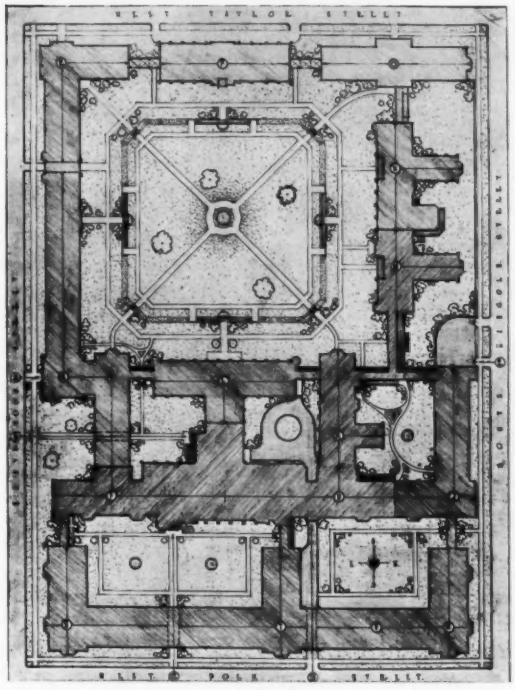
Type of construction. Fireproof
Exterior walls. Brick, limestone and terra cotta
Floors. Marble, terrazzo and linoleum
Heating. Hot water
Windows. Wood, double-hung with transoms
Area of building. 10,421 sq. ft.
Number of beds. 131
Cost of operating per day per bed. $7.05

This construction includes kitchen. Laundry, boiler room, laboratories and other service provided in other buildings. Building devoted entirely to private rooms. A special feature is the introduction of balconies on the east leading from patients' rooms.

provided for the staff where they can confer, telephone, etc. In the maternity department there should be a room in which the attending obstetrician can sleep while waiting on a case or after a delivery in the late night or early morning hours.

Administration Quarters Enlarged. Notwithstanding that charity is of first importance in the conduct of a hospital, it cannot be dispensed without money, and every facility for receiving it in return for services must be provided, just as with successful business enterprises.

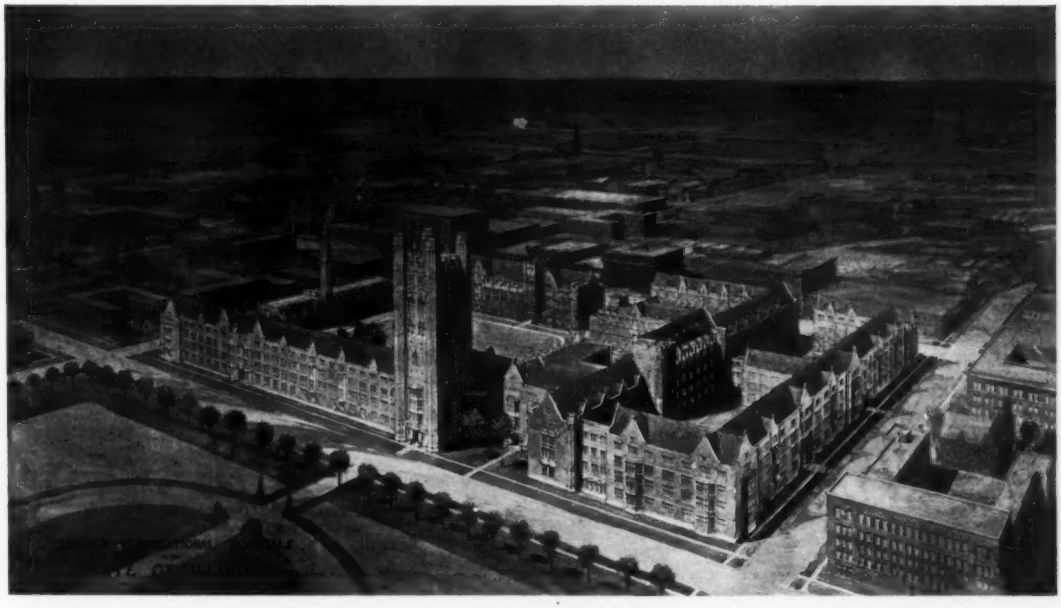
Not many years ago the business office of a large hospital consisted of merely the desk of the superintendent. He was manager, bookkeeper and cashier, but today the well ordered hospital has a public business office with an information desk similar to that of a hotel, semi-private desks for quoting rates, paying bills, for bookkeepers, accountants and typists, and private offices so arranged that admissions, charges, financial matters and all other business of the hospital can be carried on quietly without publicity or annoyance of any kind.



General Plot Plan
Research and Educational Hospitals of the State of Illinois, Chicago

A. Administration Entrance
B. Out-Patients' Entrance
C. Students' Entrance
D. Ambulance Entrance
E. Kitchen Entrance
F. Clinical Institute
G. Extension of Clinic
H. Ear and Eye Infirmary
J. Ear and Eye Extension
K. Psychiatric Institute
L. Administration
M. Orthopedic Institute
N. Orthopedic Extension
O. Infectious Diseases
P. Power Plant
R. Venereal Diseases
S. Research Institute
T. Library and Classes
V. Classes and Laboratories
W. Dental Infirmary

Maternity Quarters Increasing in Size and Equipment. Only in recent years has it been generally understood that a hospital affords many safeguards to the mother and child which cannot be furnished, or at least only with great difficulty in the home, and that the death rate is very much lower for hospital deliveries than for those taking place outside of these institutions. Consequently it is the custom today, among those who can afford to pay for the service, to go to the hospital for confinement, resulting in an increase in the number of births taking place in hospitals year by year. The probable increase should be



Perspective View of Completed Research and Educational Hospitals
Edgar Martin, Supervising Architect; Richard E. Schmidt, Garden & Martin, Associate Architects

taken into account in planning the maternity department, or the maternity hospital. The plan should permit of increasing the sizes of the various parts without destroying too much of the original value.

In addition to the usual accommodations, it is advisable to provide a nursery or room for isolating infants, and facilities for bathing the babies either in a separate room or in the nursery. The delivery and labor rooms should be separated from the wards and private rooms of patients, and special provisions should be made for soundproofing the separating floors, partitions and doors as much as is economically possible.

Out-patients' Departments. These departments have a twofold advantage: First, they provide medical service for the poor, some of whom would otherwise continue to suffer without seeking relief, their depreciated capacity becoming a burden to themselves, the community and an economic loss. The second reason is that the out-patient department provides clinical material for the physician and student, which increases the knowledge of the respective physicians and the sum of medical and surgical knowledge. It is more and more appreciated by physicians and supporters of hospitals that the hospital is logically a center for the study of medical sciences if it is to fully discharge its duties to the community. Consequently, provisions should be made in the plan of every hospital for incorporating a department of this kind. If not initially, ample space should at least be set aside for its installation in the future.

Hospital Roof Uses. Country and suburban hospitals, which are not more than two or three stories high and built on large grounds, do not require the use of the roof for patients.

Gardens on the roofs of city hospitals built in congested areas are a practical necessity which cannot very well be met by other arrangements. They should be built so that a patient can be sheltered by a wall or a roof or both, where he can be placed where he can benefit by unlimited sunshine and air. There are disadvantages in assembling patients from different floors and different departments on a roof,—transportation and supervision may be too much of a burden, and it is a better arrangement, if it is possible, to build the various stories with setbacks on ends of wings and to provide roof gardens adjacent to and level with the different wards or departments of the institution. It is sometimes possible to accomplish this by placing the largest department, possibly the surgical, on the lowest floor, and the others in the inverse order of their sizes in the succeeding stories. The roof gardens of a building arranged in that manner will be used, inasmuch as it will not be laborious to roll the patients out of the wards in their beds or wheel chairs, and yet they will remain under the observation of the nurses who can continue their duties to other patients.

Hospitals for Correctional Surgery and Preventive Medicine. The prevention of disease is now receiving greater attention than ever before. The many plagues which have spread over the world, recently influenza, have resulted in millions of deaths. The medical examining boards of the army and navy found that a large proportion of our young men had physical defects which could have been prevented or corrected if there had been periodical medical examinations. These reasons, and the knowledge that there is a growing appreciation of the fact that efficiency is largely a question of health, are leading higher schools to establish university hospitals for the study of preventive medicine and the correction of defects, for the study of the diseases of the eye, ear, nose, throat, causes of insanity, the surgical treatment of deformed and crippled children, the diseases of the blood, the heart, lung, stomach, intestines, kidney, bladder and innumerable other diseases and defects.

Universities have many leading scientists, chemists, pathologists and medical men on their faculties who can go far if they have the material to work with. They can also graduate much better classes and better doctors if they have patients to observe. The appreciation of these facts is leading to the establishment of such hospitals for the treatment of the unusual and exceptional cases and not for the treatment of many similar or routine cases. The various departments are not designed to accept a large number, but are limited to the unusual in order to permit the staff to study these and to acquaint the students with them and not send them into practice with only a foundation of book knowledge.

Tendency toward Consolidating Plants. The overhead cost of operating four or five hospitals, the total bed capacity of which is 500, is undoubtedly greater than that of one institution of 500 beds. Having four or five superintendents, engineers, switchboard operators and every other kind of officer or employe, instead of about half that number and in some cases, such as the superintendent, only one, is among the principal reasons for advocating the consolidation of small hospitals. It is obvious that a 100-bed hospital cannot have all of the departments which a 500-bed hospital can have. Some of them would be so small that the expense of equipping and operating would be prohibitive.

It may be possible to conduct a 250- or 300-bed hospital fully as economically per unit as it is for a hospital of any other capacity, and economy may be purely a personal element of management. Certainly it is uneconomical in cost and operation to completely equip several small hospitals with adequate laboratories, X-ray suites and other items of equipment and to man them with the personnel required to operate these things. In the large hospital there is so much work for the pathologist, Roentgenologist and other technicians that they are employed continuously, and every patient can have the advantage of all of the most approved examinations and treatments known to medical science.

Preliminary Survey for Hospital Design

By S. S. GOLDWATER, M.D.
Hospital Consultant and Director, Mount Sinai Hospital, New York

IN the most unreasonable manner possible (though without the slightest intention of being unreasonable) hospital boards are wont to call upon architects to design hospital buildings without first supplying the elements of a program. How can anybody plan an adequate hospital building without previously acquiring an exact knowledge of the needs of the institution, of its policies, and of all of the working methods which are peculiar to it?

What are the elements which enter into the preparation of a real hospital program? Consider, first of all, the question of capacity. Very often the figure originally given bears no real relation to actual needs. In another city or town a certain hospital has perhaps been seen and admired, and without further thought the conclusion has been reached that a hospital of that size is wanted. In other instances the starting point is a given sum of money; a rough estimate is then obtained of the "cost of construction per bed" (a most misleading term), and the size of the hospital to be built is thus determined. Common sense often demands that one cut one's garment according to the cloth, but in the planning of a hospital this is a poor rule, for even if the amount of money available is insufficient to build immediately the hospital that the community needs, an ideal program may be formulated in the hope that it will be realized step by step.

In determining the size of a hospital, the population to be served is the first element to be considered; numbers, character, and rate of growth call for separate attention. Relevant to this study are the economic resources of the community, the prevailing occupations and their health hazards, the manner in which families and individuals without families are housed, hospital facilities already available in the neighborhood, the sickness rate of the community, the presence of groups possessing special characteristics or customs (a racial group may be noted for its unusually large birth rate and for its employment of midwives instead of doctors), and religious beliefs insofar as such beliefs are likely to affect the attitude of the people toward the proposed sectarian or non-sectarian hospital.

To determine the total number of beds is, of course, only the first step. How should these beds be classified socially and clinically? What proportion of the total number of patients to be cared for are likely to be in a position to meet the cost of private rooms? How many will seek, or should be persuaded to accept, semi-private accommodations? For how many may "public" ward beds appropriately be provided? Is the community one in which the incomes of a considerable part of the population fluctuate, and should the hospital plan, therefore, be of so flexible a character that the line which separates the public from the semi-private wards, as well as that which separates the semi-private from the private room service, may be readily shifted? If the building program has to do with the expansion of an existing hospital, to what extent can the present buildings be adapted to the larger program?

Hard upon the heels of these questions follow others no less fundamental. What is the contemplated scheme of clinical organization? Besides the basic departments of medicine, surgery, obstetrics, and pediatrics (the present article is written from the standpoint of the planning of a general hospital), what clinical branches are to be recognized? In this connection, consideration must be given to the diseases of women, to diseases of the eye, ear, nose and throat, to venereal diseases, to urology, orthopedics, dermatology, neurology, and psychiatry. And always there remains the puzzling question of contagious diseases. In New York an ordinance requires the inclusion in any general hospital of certain minimum accommodations for the care of contagious cases, but the problem is an urgent one apart from any question of legal compulsion.

The immediate building program and the future expansion of the hospital should be separately considered. Clinical expansion may be anticipated in two directions: in the case of a hospital in which the various clinical specialties are at the outset either unrepresented or incompletely represented, the subsequent introduction of additional clinical departments may be taken for granted; while in the case of a hospital which is completely organized at the outset, the probable rate of growth of each of the different clinical divisions must be considered. Just now the demand for maternity beds is increasing throughout the country more rapidly than is the demand for hospital beds for any other purpose. Recent statistics show that 13 per cent of all of the children born in the United States are born in hospitals, but in a few communities the figure has risen to 40 per cent.

Before dismissing the subject of clinical organization, it is necessary to consider the handling of convalescents. Are separate convalescent wards desired, or is there to be an affiliation with a branch hospital for the treatment of convalescents? It matters a great deal whether the average stay of hospital patients is 12 days or 20; the shorter the stay the greater the treatment facilities required.

In planning a university or teaching hospital special needs are encountered. In such a hospital clinical lecture rooms of various kinds must be featured, and locker rooms, toilet accommodations, and perhaps lunch rooms for medical students provided.

The location, size, and equipment of the clinical record room depend in part on the proposed method

of administration. In some hospitals the clinical records of both in- and out-patient departments are assembled at a single center, but this procedure is by no means uniform.

Every ambitious hospital has, or hopes to have, a medical library. In hospitals of moderate size it seems desirable to locate this near the clinical record room, so that the same person or persons can supervise both library and clinical record room.

The number of operating rooms should be calculated with relation to the total number and kinds of surgical cases to be treated, and with due regard to the organization and working methods of the staff. In a staff or "closed" hospital the number of operating rooms required is relatively smaller than in an "open" hospital, where the convenience of a larger number of visiting surgeons enters into the case. Operating rooms in which artificial illumination only will be used should be differently planned from those in which natural lighting is preferred.

The architect needs guidance in planning operating room accessories. How large a dressing and locker room is desired for the visiting staff? Is each surgeon to have his own private locker? Is a separate dressing room required for the house staff? Are surgical dressings for the entire hospital to be sterilized on the operating floor, or elsewhere? Where are the surgical supplies to be prepared, and how much space will be required for the purpose? Will patients be anesthetized in anesthesia rooms or in the operating rooms? Is a recovery ward desired? Do the surgeons want top light, or will vertical north windows suffice? Are professional visitors in large numbers expected to be present at operations? Will portable observation stands for the visitors suffice, or are built-in galleries called for?

Before planning the laboratory it is desirable to get the fullest information possible from those who are to be in actual charge of the laboratory work. All of the laboratory work of a hospital of a moderate size may be done in a single large room, but in that case the equipment of the room will be most varied. Separate rooms are usually wanted for pathology, bacteriology, serology, and chemistry. The manner in which the house staff are to participate in the laboratory work of the hospital should be defined. The program may contemplate the routine examinations of specimens of blood, sputum, urine, gastric contents, etc., in a special clinical laboratory or laboratories set aside for the exclusive use of the resident staff, major laboratory determinations only being referred to the central laboratory. Where the highest scientific standards are sought, laboratory facilities of a modest kind may be demanded in connection with each ward.

The hospital should be called upon to define its policy in relation to scientific research. If laboratory investigations are to be intensively prosecuted, rooms and equipment must be provided for this work, apart from the laboratory equipment which is intended for the routine work of the hospital. Quarters for test animals are essential, and for a research laboratory an animal operating room is indispensable.

Certain auxiliary diagnostic and therapeutic services may next be mentioned. First and most important among these is the department of radiology, embracing radiography, fluoroscopy, and radiotherapy; this is a department which calls for the most careful study, in which the radiologist (and perhaps the firms which are to supply the equipment) should take part. Other divisions are the division of electrocardiography; the respiration laboratory; the department of bio-physics (radium treatment); physiotherapy, including hydrotherapy, thermotherapy, and mechanotherapy. Occupational therapy is related to both physiotherapy and psychotherapy. The dental department might be mentioned as a special clinical branch, although in most hospitals the work of the dentist is regarded as subordinate to that of the regular clinicians; in any event, the extent and character of the projected service requires definition. The accurate recording of certain clinical phenomena demands the use of photography, and photographic ateliers are found in a constantly increasing number of hospitals.

Receiving or observation wards, which are difficult to classify clinically, owing to the miscellaneous character of the service which is demanded of them, nevertheless facilitate greatly the proper classification and handling of newly admitted cases. What shall be their capacity? To answer this question intelligently, the hospital's methods must be known.

Emergency treatment room or rooms and the ambulance entrance should be close to the receiving wards. Is the neighborhood one in which accidents are many or few? Will a single emergency treatment room suffice?

Balconies, roof wards, and solaria comprise an important group of facilities from the standpoint of effective medical care and health, and naturally the building committee must decide upon their number and capacity.

The plan of the out-patient department may be a liberal one, including separate accommodations for the departments of medicine, pediatrics, obstetrics, neurology, mental hygiene, dermatology and syphilis, surgery, diseases of the eye, ear, nose and throat, gynecology, orthopedics, genito-urinary diseases, proctology, gastrology, dentistry, infant hygiene, and adult hygiene. If a comprehensive organization of the out-patient department is desired, all or nearly all of these departments must be represented, but only in the largest hospitals is any attempt made to admit patients to all of the enumerated departments simultaneously. A more modest program may be chosen,—one which requires that groups of departments utilize the same rooms at different hours. In estimating out-patient capacity, the architect should remember that the capacity of a department may be doubled by holding two daily sessions instead of one. The utilization of an out-patient department for teaching purposes affects markedly the character of the plan, and the purpose of the

hospital in this respect should be made known. Other questions which have relation to out-patient planning are, that of the central or common record room *versus* individual departmental record keeping; the manner in which the drug department is to be conducted; the manner in which patients are received and their "histories" taken; the utilization of the out-patient department as a clinic for paying patients or as a follow-up station in connection with the hospital's ward service; the conduct of the social service department.

For the planning of the administrative or business center of the hospital, certain information is requisite:—the number and functions of the executive officers; the method of receiving, registering, and admitting patients (all patients may be received at a single entrance, or a separate entrance may be provided for private patients); the character of the social service organization and its office requirements; the number and duties of officials connected with the training school for nurses; the number and duties of heads of other administrative departments, for whom offices are required; the number of employes in the accounting department. The telephone system calls for careful consideration (telephone "central," booths for public use, interior and exterior telephone service for officers, staff, employes, etc.).

Inquiry should be made concerning the needs of the medical staff, especially as to a meeting or clinical conference room, registration room, lounging and locker room, and consulting offices.

The major topics in connection with the planning of the nurses' home are these: total capacity, teaching facilities (classrooms, laboratories, demonstration rooms), students' bedrooms, quarters for night nurses, special suites for officers, social rooms, quarters for attendants or nurses' aids, sleeping porches, nurses' infirmary, gymnasium, tennis courts, swimming pool, servants' quarters, kitchen and dining room service.

Dormitories and living rooms apart from the nurses' home are those for the superintendent or director of the hospital (frequently the superintendent has a cottage of his own, on or off the hospital grounds), for the superintendent's executive assistant or assistants, and for the resident medical staff. Local custom and local circumstances will determine how large a percentage of the domestic and other miscellaneous workers should be lodged on the hospital premises.

No attempt should be made to plan a hospital kitchen without previously determining the character of the food service. It is essential to know not only the number of persons to be fed, but whether food is to be sent to the wards in bulk or on individual trays; whether trays are to be prepared in the main kitchen or in the wards; whether there is to be a special diet kitchen for "feeding" cases; whether nurses are to be taught in the main kitchen or the diet kitchen. The capacity of the dining rooms for various classes of the hospital inmates must be studied, and the question of waitress service *versus* self-service (cafeteria) settled.

The laundry should, of course, be planned with relation to the volume and kind of work to be done. In this connection, the experience of hospital laundries under actual operation should be sought. The architect should know whether the hospital proposes to reclaim used surgical dressing gauze; how much space is wanted for sewing and mending, for the storage of linens, for sorting and distributing laundered goods.

Whether the clothing of ward patients is to be cared for in rooms adjoining the wards or in a central clothes room for patients is a matter of hospital policy; and, indeed, it is for the hospital to determine the exact nature of all the miscellaneous fixed equipment required for nursing or other purposes in connection with each ward unit, always remembering that all wards are not alike in their requirements.

Will the hospital produce its own light and power? What fuel is to be used—coal or oil? How accessible are reliable sources of supply? What should be the extent of the storage facilities? For each hospital and for each part of the hospital the problem of ventilation should be separately worked out, but an agreement should first be reached on fundamental principles of air supply and treatment. The number of elevators is a question for the architect rather than for the building committee to determine; but without investigating, the architect will hardly know whether visitors are likely to be few or many, whether the visiting staff will be large or small, whether patients in bed or in wheel chairs will be sent to the roof.

Shall the heating system be hot water or steam? Is the city water supply ample or must it be supplemented? Is a filtration plant necessary? Is a sewage disposal plant required? What are the legal and what the practical requirements in the matter of fire stairs, fire escapes, fire apparatus, and signal systems? Is the garbage to be carted away or to be incinerated on the premises? Are surgical dressings to be incinerated in a central destructor, or in small incinerators distributed throughout the hospital?

In due order the hospital authorities should express their preferences concerning apparatus for sterilization, refrigeration, and vacuum cleaning; concerning the illumination of wards, operating rooms, and laboratories; in relation to time clock systems, the care of mattresses, the location and arrangement of storerooms and trunk rooms, the number, kind, size, and locations of work and repair shops, the width of corridors, the use of clothes chutes, the location of the morgue and autopsy room, and the need of a mortuary chapel.

If the foregoing notes are taken as a guide, the skeleton, at least, of a practical hospital building program can be prepared. On all of the questions mentioned, and more, the architect is entitled to complete data, if he is expected to plan a hospital building that will adequately meet the needs.

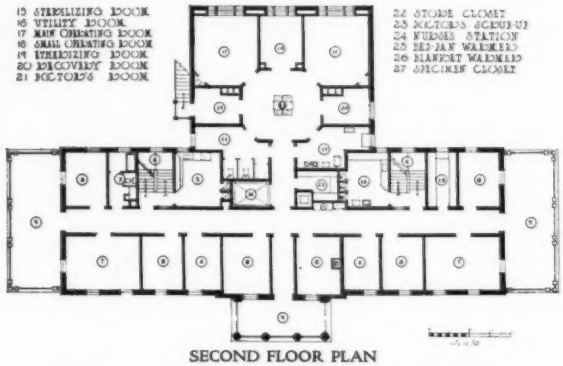
Trumbull (Private) Hospital, Brookline, Mass.

HAROLD FIELD KELLOGG, ARCHITECT

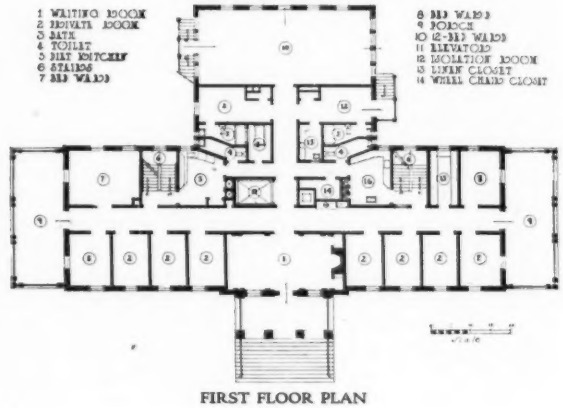
GENERAL EXTERIOR VIEW

Second Class Construction. Date of Contract, Jan. 1921. Cubage 194,600 ft., Area 5560 sq.ft., Cost $144,988, Cost per cu. ft. 74½ c. 52 Beds. Cubage per Patient 3840. Steam Heat, Gravity Ventilation. Complete Individual Building

DETAIL OF PORTICO



SECOND FLOOR PLAN



FIRST FLOOR PLAN

The Selection and Development of Hospital Sites

By KENDALL, TAYLOR & COMPANY, *Architects, Boston*

IT is important that those who are to decide upon the location and site of a new hospital shall approach their problem without prejudice, for there are many conditions which will tend to warp their judgment and lead them to a decision on grounds of expediency or fancied economy which will in the end prove unsound and possibly prevent future growth and necessary expansion. Gift horses should be looked at in the mouth, to be sure they are sound.

The selection of a site is frequently made months, often years, before the architect is called into consultation, and seldom excepting in the case of "specialists" does the architect have a voice in this all-important matter. From the point of view of the trustees this may not be an important matter, but use of many ill-advised sites, taking the country over, makes one wonder if such advice—usually cheerfully given gratis—might not have had some weight in the selection of better locations.

The architect's problem, therefore, is either with his medical advisers or building committee, or with whichever group his direct contact comes, to analyze and study the conditions as he finds them. If, as is frequently the case in a suburban or country location, the lot is of several acres, an ingenious architect, with the aid of the many published articles on this subject, should not go far wrong in the proper orientation of whatever building or buildings are to go on the lot.

The type and character of the institution has to be considered—whether general, children's, orthopedic, maternity, contagious, mental, tubercular, etc. The first named can be, and often are, nearer or within the more settled districts, and opinions may vary as to the advisability thereof; the three last named should be more remote, for the good of the patient, if for no other reason, and all classes of hospitals for children should be so situated that the maximum of pure sunshine and clear air will be available. This holds for adults as well.

Physicians practice in the busy centers of life; their time and strength are limited, and the range of their activities is controlled by physical conditions which must be regarded. It is true that the motor car and ambulance have greatly widened the areas within which the practitioner of medical and surgical aid can act, but they are often called to more than one hospital and must be able to reach patients with the least possible expenditure of time and energy. Therefore, in the choice of a site one must consider not only the location ideal from the point of view of the patient, but its accessibility for patient, doctor, nurse and service. The resultant of these forces will usually be somewhat of a compromise for all the factors in the case.

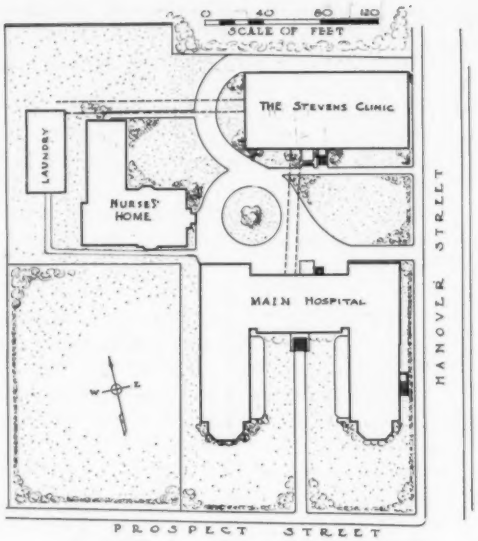
There will always be the physical surroundings to be considered,—whether the trolley or steam cars pass near enough to annoy, in city locations, and today the possibilities of the proximity of a large garage or, as in an instance known, a paint factory on one side and a silver reclamation plant on the other. In country or suburban sites, a choice collection of gravestones may be in view, or a farmyard that distills odors which will drift in at the windows or across the lawns. A site in a district now nearly residential may be chosen, and in less than a generation the character of the community may have so completely changed as almost to warrant the abandonment of the plant. On the other hand, barring the possible gravestones, the chances are that the suburban site will improve rather than deteriorate, and the country site is always susceptible of improvement by purchase of adjoining properties at a modicum of expenditure. There are few city instances where this can be done. All of this indicates the wisdom of securing either an ample area in the beginning, or a location where future expansion can be secured without prohibitive costs. An ample area almost of necessity indicates avoidance of closely built areas and means a location either suburban or in the actual country.

Suburban sites give opportunity for acquisition of areas providing space for expansion and for the control of the immediate surroundings to an extent sufficient to eliminate noise, dust and other nuisances. The country affords these in still greater measure, and were these alone the controlling factors, it would inevitably dictate the choice; but the hospital not only houses the patient, it also gives the physician his opportunity to care for him, and it ought to make it possible for friends and relatives of the patient to visit him and, in case of emergency, gain prompt and easy access to him. The desire for open spaces and ample ground must, therefore, be tempered by these necessities.

The orientation of a hospital building or group is an interesting study from the theoretical and the practical sides. Physicians and scientists are well satisfied that the healing effect of the sun's rays and open air is beyond question. To almost every patient it is desirable to bring these helpful agents in as full a measure as possible, and in the ideal hospital every room would have a full sun bath all day long. Unfortunately this is not possible, but it is possible to so locate the building that under certain conditions and at certain seasons every side shall have the sun for a portion of the day. When the building goes beyond the simplest rectangle in plan, with an east and west axis, this means a distinct study.

The careful studies by William Atkinson, published in *The Brickbuilder* in July, 1903, and reprinted in *Organization and Management of Hospitals* (Cleveland Press, 1907), which are quite generally accepted as standards for this subject, show

the approximate duration of the periods of light and shadow for different seasons. The best results in our northern sections are secured by rooms facing the south, and average results by rooms facing, in general, southwest or southeast. In a large building there will be inevitably some rooms where there will be no direct sunlight at any time, and the skillful architect will so plan his building that these rooms will be used for purposes where the direct rays of the sun are not vitally necessary, or for temporary occupation only. City locations cannot always be controlled, despite the best of advice, but here again the designer must, and of course will, keep the fundamental requirements in mind and will consider the disadvantages occurring from neighboring buildings that cast their shadows behind or before them.



Plot Plan, Union Hospital, Fall River, Mass.
Kendall, Taylor & Co., Architects

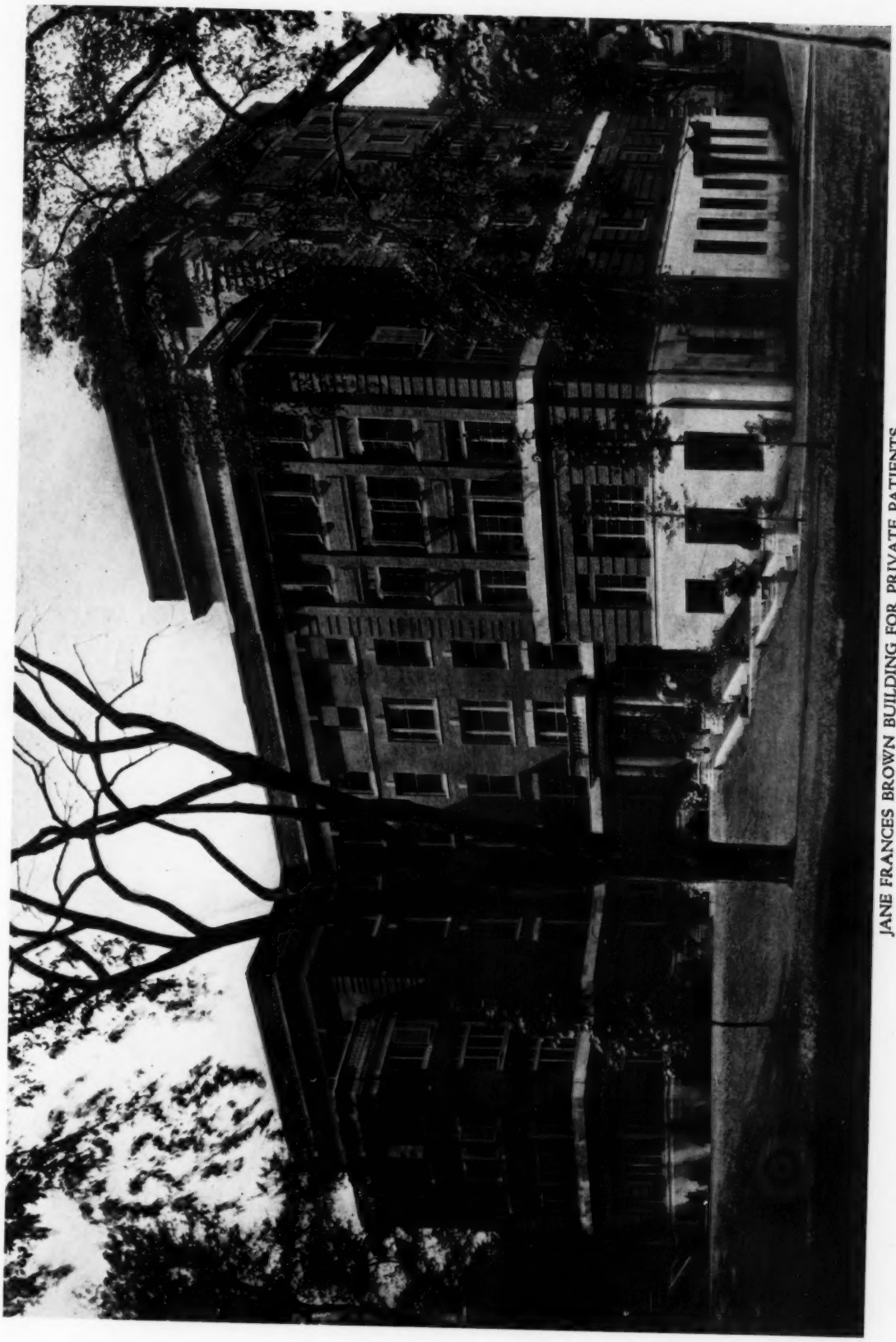
The site having been determined upon, a study of the comparative advantages of the various types of hospital should be carefully considered; zoning laws and other legal restrictions require consideration.

Economy in construction and maintenance have demonstrated the advantages of the multi-story building, and one of the very latest and best of these is the Fifth Avenue Hospital in New York. Another and much smaller type is the "Stevens Clinic" connected with the Union Hospital, Fall River, Mass. In this latter case the first and comparatively new buildings of the original group had become not obsolete but simply outgrown; the lot was far too small for development, and when it came to expansion it was either up, west or north. The first two methods were deemed inexpedient for certain reasons, but purchase of a small amount of land to the north enabled the development of the addition, but necessitated an involved study of the shade angles, for the new building had to have an east and west axis, quite desirable to be sure, but to the south and within a short distance were the original buildings. This, coupled with the all desirable and required balconies, finally evolved the setting back of each story, doing away with the heavy shadows of ordinary balcony construction. There is nothing new in the principle, but in hospital work it has not been done to any great extent. (Continued on page 261)

Exterior View of End

Detail of Airing Balcony

Stevens Clinic, Union Hospital, Fall River, Mass.
Kendall, Taylor & Co., Architects



JANE FRANCES BROWN BUILDING FOR PRIVATE PATIENTS,
RHODE ISLAND HOSPITAL, PROVIDENCE
KENDALL, TAYLOR & CO., ARCHITECTS

JANE FRANCES BROWN BUILDING
RHODE ISLAND HOSPITAL
PROVIDENCE

Illustration on Plate 94

FIFTH FLOOR PLAN

SECOND AND THIRD FLOOR PLANS

FIRST FLOOR PLAN

Type of construction. Fireproof
Exterior walls. Brick
Windows. Wood, double-hung
Area of building. 8,660
Cubage of building. 600,000 cu. ft. without connecting tunnel
Construction completed. 1922
Cost of building including certain fixed equipment. About $750,000
Number of beds. 86
Cubic ft. per patient. 6,976
Cost of operating general institution per day per bed. $3.78

This building is devoted entirely to private patients. Kitchen, linen storage and ambulance receiving room provided in the basement. Fourth floor similar to second except for nursery occupying space of two rooms and corridor at rear of right wing. Laundry and power plant in separate building.

The Brown Memorial Building of the Rhode Island Hospital, Providence, is a unit of a large city hospital for people who are fully able to pay for their care. The conditions surrounding the location of such a building are not in any way different from any other type of building. In this particular instance all of the disadvantages of a busy city location had to be carefully weighed. Fortunately, the trustees of this hospital from the outset 60 years ago have been men of keen vision, and sufficient land for building, protection and even a delightful view was available.

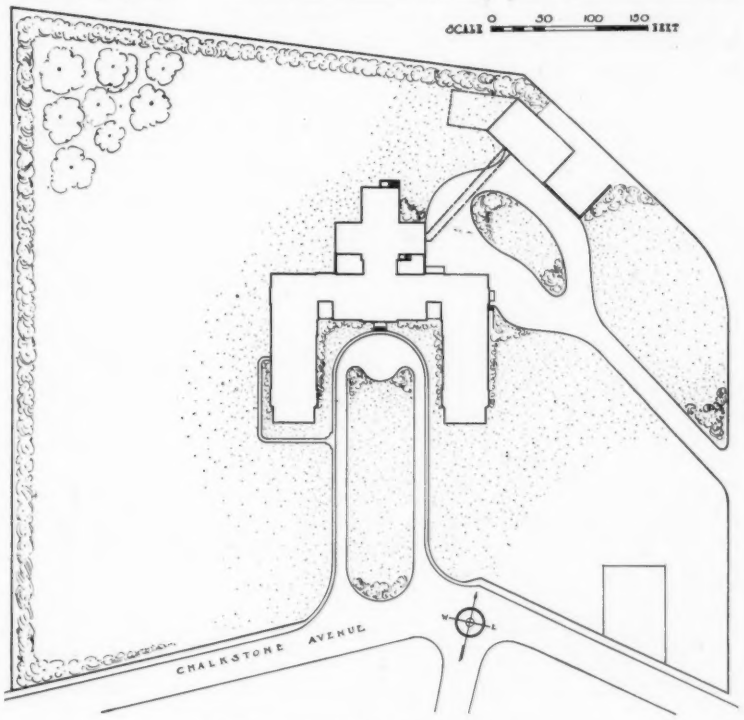
Another interesting illustration is of the 250-bed Homeopathic Hospital, also at Providence, construction of which has been but recently started. The site for this group of buildings is practically suburban, almost country, yet geographically it is not so and is in fact but ten minutes from the business district by trolley cars which operate on the main street adjoining. No trouble will be experienced from fuel, oil gases or soot from factory chimneys, for the prevailing winds will carry them far to the south. The site is to the northwest of the city center. The lot, containing several acres, will permit of more than doubling the bed capacity of the hospital, if ever required, by building to the east or to the west. To the north, across a wide parkway, are large properties, one a convent and the other a site for another hospital, making for permanency in surroundings in that direction, and to cap the climax, to the south and across the principal thoroughfare is a beautiful old estate, now a large city park.

This hospital will care for all cases usually admitted in a general hospital, with particular attention to people of varying means, and special attention will be given to obstetrical and orthopedic work. Too frequently these latter branches are treated apart in special institutions, handicapping and limiting the hospital activities and the training of the nurse. Again, up to comparatively recent times a general hospital has been too frequently for but one class of people,—charity or semi-charity, —and sad to say, for some who abused the privilege. Now, not only in this group, but in many others, every pocketbook can be suited. There will be some wards in the East wing, but none of over four beds. It was not deemed practicable to give each patient a separate room, but each patient in such wards can be in a separate cubicle if he so wishes.

The Leominster Hospital is a hospital to serve a community of about 20,000 people (at the present time) and is a country hospital insofar as its location is concerned. The lot was given by an individual who was wise enough to obtain the best advice possible (the architects were not consulted in the case, but had they been, would have approved the lot) and is sufficiently large not only for future growth, but to permit of a choice of several locations for the buildings. The particular merits of this plan are obvious to the initiated, so far as orientation and ease in care of patients are concerned, but it is only fair to say that it is not quite so economical in first cost as a plain, rectangular building housing the same number of patients. These examples are taken at random from recent work, in the belief that, briefly explained, they will be of interest and value.

It has not been thought necessary to consider the low pavilion type of building so common abroad, at Vienna and other places, in which a large number of buildings of one or more stories are spread over an immense area, requiring a vast original outlay and continued maintenance expense and expenditure of physical and other forces. The pavilion system has been used to an extent in this country, but economy has demonstrated the advantages of multiplying stories and installing elevators with a consequent reduction in the ratio of the cost per patient. Many of those built 20 years ago as one-story cottage hospitals have long since had the roofs raised and other stories built thereunder, to the happiness of all concerned.

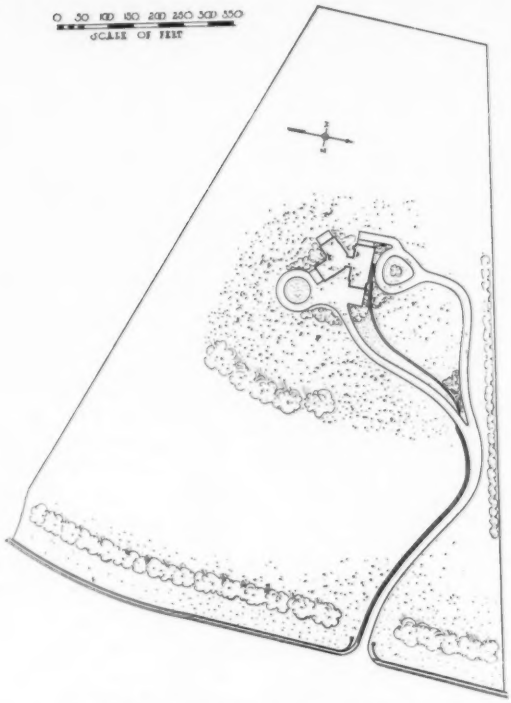
In the discussion for any particular case of the



Plot Plan, Homeopathic Hospital, Providence
Kendall, Taylor & Co., Architects

advantages of open or pavilion hospitals *versus* centralized or many-storied, the opinion of the trained medical and nursing authorities, whose active lives center in these buildings, will be found invaluable, and in their practical experience many well reasoned theories may yield to the test of use. It would be presumption to ignore their accumulated wisdom, even though it sometimes seems to clash with preconceived theories.

The hospital architect has developed his skill from co-operation with these people, and wherever possible he will seek the counsel and advice of such, whether the project be small or large. Such co-operation means a more successful plant when completed, and that in itself should be a measure of satisfaction to the designer. This spirit of co-operation between the architect and the administrators, building committee and whoever are concerned, requires time and tact, but it will prevent to a great degree "unbalanced hospitals."

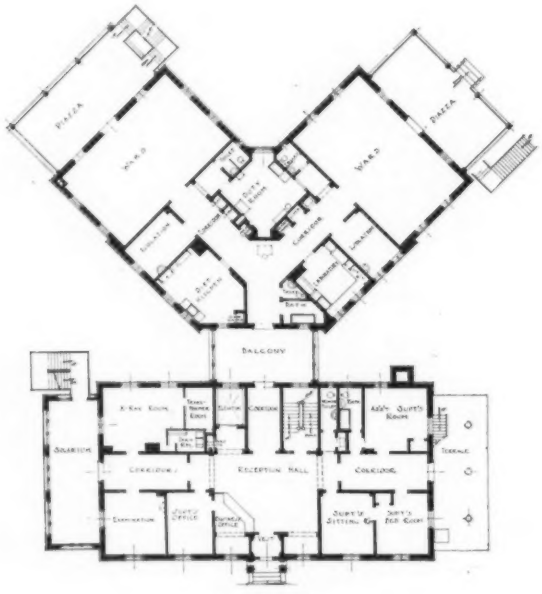


Plot Plan, Leominster Hospital, Leominster, Mass.
Kendall, Taylor & Co., Architects

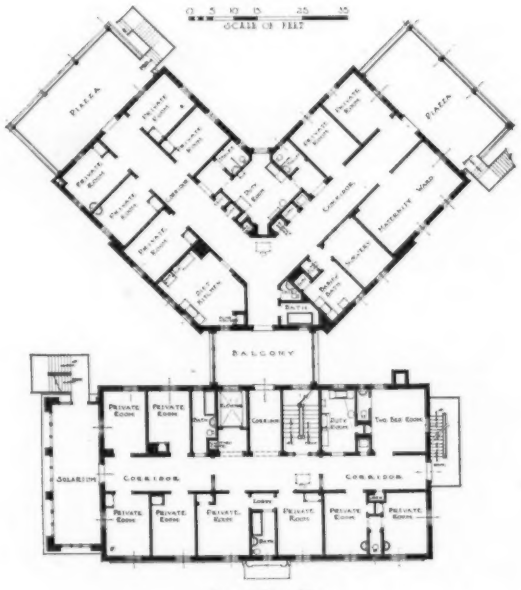
No branch of the building industry (or architecture, if it sounds more pleasing) requires more study, analysis and actual experience than the planning and the erecting of a hospital, and none is more worthy of the best thought that can be brought to bear thereon.

Let the architect remember his training and profession, be awake to all he can absorb of the continued needs and requirements of the medical profession that he may come in contact with, co-ordinate thereon, and even lead when necessary.

He should—if he can—bring to bear on a given problem all the past experience he may have been fortunate enough to acquire or able to assimilate, but ever remember that he is primarily "one versed in the art of building." The correct building of a hospital is a matter of great importance to a community, and its success depends in a large measure upon the skill of the architect who plans it.



First Floor Plan



Second Floor Plan

Leominster Hospital, Leominster, Mass.
Kendall, Taylor & Co., Architects

Details of Planning General Hospitals

By EDWARD F. STEVENS, A.I.A.
Stevens & Lee, Architects, Boston and Toronto

WITH the site selected, the preliminary survey made, and the classes of patients to be cared for determined, the problem that confronts the hospital management is the *details of planning* the various units and the relation and correlation of these general units into a complete hospital, functioning with the least friction for the care of the patients; for the whole perspective of our problem must be focused on the patient. Whatever can be done to strengthen the service or to make the way clear to the best care of the patient makes for the better hospital.

As the hospital centers around the sick patient, we may well consider the patient's quarters first; and as the patient spends the greater part of his time in bed, let us first consider the ward unit, the relation of the patient's room to the utilities and dependencies, and the shape and character of the rooms.

Wards. The rectangular or long ward, with a row of beds running along either wall, is perhaps the most common form and one which will be used where absolute economy of space is considered, for with this form of ward the entire group of patients may be under the surveillance of one person. The disadvantage of this type is its lack of flexibility, for if planned economically as a ward, it cannot be converted readily to any other purposes. In a multi-story building, every story must be of the same width and shape, unless a form of construction is used as in the Harper Hospital in Detroit (Figs. 1 and 2). Here the first three stories are devoted to private rooms. The width of the building is then reduced, and the three upper floors made the proper width to care for two rows of beds.

With the square ward for a number of patients, a form which the writer found at the Rigs Hospital in Copenhagen may be adopted. By the introduction of permanent screens, a room, say 40 x 40, is subdivided into four alcoves, each of which will hold four beds, thus making a 16-bed ward as at the Bridgeport Hospital (Fig. 3), or it may be made into a 24-bed ward as in the Cumberland Street Hospital in Brooklyn by lengthening the ward (Fig. 4). The subdividing screens should be sufficiently rigid to support the bedside lights and the nurses' call, but left open at the top and bottom for circulation of air. One particular advantage of this shape of ward is that no patient faces the light and that only four patients are in one group.

The growing tendency toward smaller wards and greater privacy in our hospitals has led to the planning of smaller wards which will approximate in privacy the single room and give the ease of care of the open ward. Such a ward is designed for the new Biltmore Hospital at Biltmore, N. C. (Fig. 5).

In these cases the six- or eight-bed ward has placed at its center a sub-sink or service room, dividing the ward in two. In this sub-sink room will be a bowl, a sterilizer and a water-closet with a special bedpan emptying device. With this arrangement, the distance to be covered by the nurse in attending to her duties is minimized. To further add to the privacy and give each patient almost a private room, a permanent screen, extending from the wall at the head to the foot of the bed and about 7 feet from the floor, may be used. The screen may be made of plaster with solid 2-inch walls, and to allow more flexibility and an opportunity for sociability a door about 2 feet square is made in such a position that, when open, two patients in adjoining beds may converse as well as if the screen were not there. The two-bed, or what is generally called the "semi-private," room will always be popular.

Private Rooms. The present-day hospital demand is largely for private rooms, and many advocates of private rooms for the general hospital patients claim that the cost of building and administration of such a plan is no greater than of the ward system. To most architects, however, it is self-evident that the greater the area, the more running feet of partitions, and the more plumbing fixtures, the greater the cost. But every hospital should have several more or less private rooms where the very ill, the delirious, or the moribund patient may be placed, as well as for those whose means will allow the private room expense.

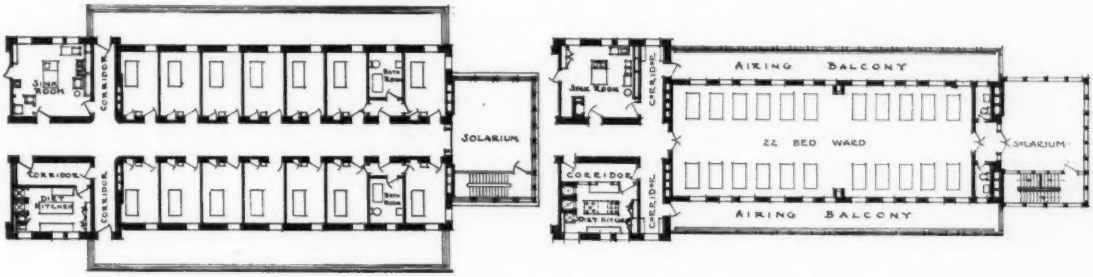


Fig. 1 Fig. 2

Ward Plans, Harper Hospital, Detroit
Malcomson & Higginbotham, Architects; Edward F. Stevens, Consulting Architect

As far as possible the private room should have its own toilet and wash-basin. The toilets may be individual with each room, as in the Fifth Avenue Hospital (plates 89, 90), or placed between two rooms as in the Biltmore Hospital (Fig. 5). The private bath may be shared by two rooms, as shown in Fig. 5, so arranged that each room would have its own water-closet and that, by the use of a common door, the bathroom could be shut off from one or the other room. The percentage of rooms with baths may well be small, as the tub is used but little for the very sick patient.

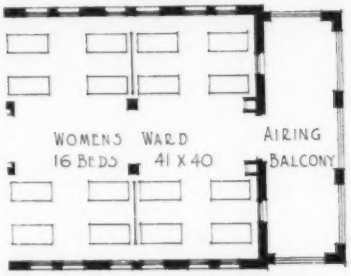


Fig. 3. Alcove Ward Plan, Maternity Hospital, Bridgeport, Conn.
Edward F. Stevens, Architect

Patient's Clothing. It is the writer's belief that in the small wards, at least, and in the private rooms, provision should be made for the patient's clothing within the room enclosure by a simple, built-in cupboard which can be easily cleaned and ventilated. For the ward patients, a patients' clothing room may be provided in some well lighted and ventilated space, and the clothing properly bagged or put in lockers.

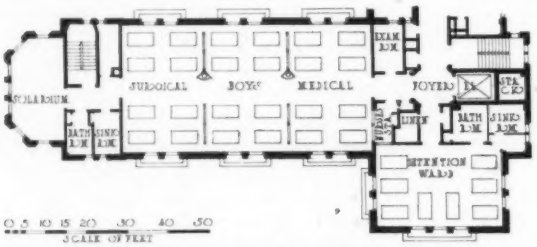


Fig. 4. Alcove Ward, Cumberland Street Hospital Brooklyn
Ludlow & Peabody, Architects

Utilities. Next in importance to the proper housing of the patient comes the service to the patient. For this, certain service rooms must of necessity be near at hand, and these are the serving kitchen, the sink or duty room, the medicine closet, the toilets and the bath. In the larger institutions, there may be added the surgical dressings room, the flower room for cut flowers, the nurses' room or station, and the housemaids' (sink) closet.

The method of serving food to the patient is one that is undergoing many changes, and it is impossible to lay down any rules that all hospitals would or could use; but the improved method of carrying food in insulated carriers and the possibility of serving the patients "direct from the wagon" make the use of the serving kitchen of less importance. Whatever the method of service, there are always occasions when some food or stimulant must be prepared, and a room with facilities for this preparation must be at hand.

The Sink Room. Whether or not there are toilets connected with the wards and rooms, the utility room or nurses' workroom is needed, for here must be facilities for washing rubber blankets, making poultices, preparing disinfectants, and sterilizing bedpans and urinals; in fact, the room becomes the nurses' workshop for all of the dirty ward work.

Toilets and Baths. With the open wards, toilets either directly connected or near by are necessary, but with small wards, where toilets are directly connected, the general toilets may be minimized or omitted altogether.

The bath, whether tub or shower, has a limited use on the general ward floor, but it should be selected with reference to the easy bathing of the patient and placed high to allow of the greatest assistance from the nurse or attendant. Where the patients cannot be trusted to bathe themselves, in some sections of the country the high or slab tub is used, giving greater freedom in actually bathing the patient. With this form the attendant stands and sprays the patient with clean water as with a shower. The shower bath is used very little by sick patients.

Nurses' Station. Just where the nurse should be stationed is a subject of much discussion—whether in a chart room set apart, where she may be quietly by herself; in an enclosed section of the corridor, with observation windows giving a lookout up and down the corridors; in the open corridor where she would have an unobstructed view of the entrances to the rooms and utilities, or, as in many foreign hospitals, in the ward proper. With private room service it would make little difference so long as the location was near the center of service, but with large ward units

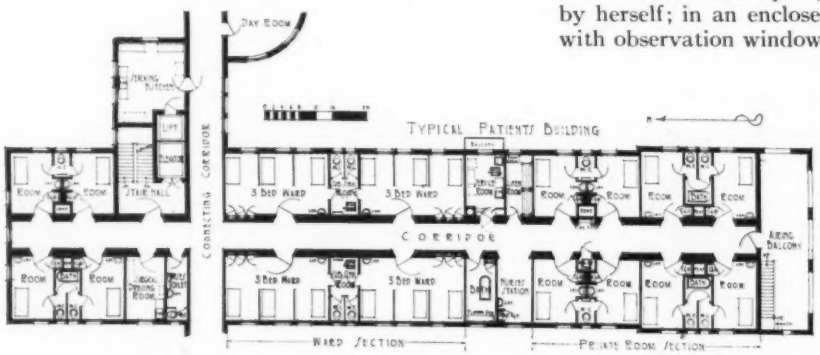


Fig. 5. Pavilion of Small Wards and Private Rooms, Biltmore Hospital, Biltmore, N. C.
Stevens & Lee, Architects

the writer feels that the nurses' station should be either in the corridor or in a booth projecting into the corridor as in the Ohio Valley General Hospital (Fig. 6) and the Ross Pavilion of the Royal Victoria Hospital (Fig. 7). Wherever this station is, at that point should be concentrated the annunciator for the patients' calls for the nurse, the telephone and the medicine cupboard.

With a predominance of large wards, the surgical dressings room is a most desirable adjunct, in fact a necessity. Here all dressings would be prepared, all instruments sterilized, and every provision made for the after-treatment from surgical operations. This room should be of sufficient size for good working space around the stretcher, a room at least 11 or 12 feet wide.

Before leaving the consideration of the ward unit, the location of the stairs and the elevator may well be discussed. These, with the serving kitchen and sink room, are the noisy parts of the hospital and should be shut away from corridors, and it is often well in small units to have the stairs and elevator in one enclosure, as in the Brandon General Hospital, shown on plate 95.

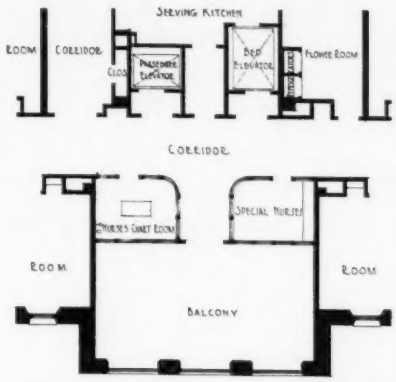


Fig. 7. Nurses' Station, Ross Pavilion, Royal Victoria Hospital, Montreal

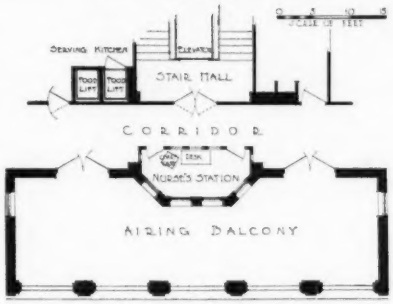


Fig. 6. Nurses' Station, Ohio Valley General Hospital, Wheeling, W. Va.
Edward F. Stevens, Architect

The Children's Ward or Section. Conditions governing the care of sick children differ so much from those governing the care of adults that a part of the hospital should be set aside for their reception and care. The nose and throat of the child seem to be fertile ground for the quick development of all kinds of maladies. A child may be entered with a well defined case of mumps, let us say, and in a few days it will be discovered that he has scarlet fever, measles or anything on the list of communicable diseases, so that the only safe and sane method of dealing with the admitting department for children is to treat them as if they had the most virulent diseases, keeping them away from other children until any latent "bug" has its chance to develop. This means an admitting department, and this department should be subdivided with screens or cubicals so that no patient may be brought in contact with another (Fig. 8). To this end, every faculty should be at hand for the proper handling of the patient,—basins with hot and cold elbow-action faucets, provision for opening of doors without touching the hand, sterilizers for bedpans, sterilizers for dishes, and in fact every provision which would be made in a well regulated hospital for the communicable diseases.

The children's ward may be much the same as that for adults, but never too large, because of the noise and confusion. The child, however, does not have the same feeling as does the adult of being "herded" if he is placed in the open ward; in fact the child is happier if he is with other children.

One important feature should be mentioned in regard to children's care; that is, provision should be made for the day- or playroom where the convalescent may have his toys, the blackboard and the "kiddie car." This room should be sunny and cheerful, with pictures on the walls, and soft, easily washable floors; in addition to this, airing balconies or out-of-door playrooms should be provided.

While in this paper the isolation department is not taken up in detail, it should be borne in mind that no general hospital is complete unless provision is made for the isolation of the occasional infection which is likely to develop in even the best regulated hospitals. This section need not be large, but it should contain room for a patient or two, and should be provided with adequate utilities for their proper care without the necessity of calling upon any other section of the hospital excepting for food supply. The most important equipment details are the sterilizers, and ample provision for washing the hands with non-hand-touching fixtures should be made.

Solarium. Solaria, as well as open air balconies, should be provided. If only a solarium is had, this should have windows which, when open, will give open-air conditions. Where it is possible to have both the solarium and the open-air balcony, it has been found that even in the colder Canadian climate the majority of patients will choose the open-air balcony. It should be remembered that a solarium at times may be overcrowded by patients, and to this end ample ventilation should be provided.

Operating Suite. The question is often asked by hospital boards, "Where should the operating room be placed?" No definite rules can be made for the location, and the answer must be governed by the size and location of the hospital. There are some conditions where the operating suite would function better on the first floor, and others where the top story would serve better.

It has been found in many small hospitals that if

the entire first floor is given up to offices, laboratories, operating and X-ray service rooms (in other words, if this floor is made the "workshop" of the institution), better results can be achieved, for the upper floors may then be given over entirely to patients. This is particularly true in the small hospital plan when possible.

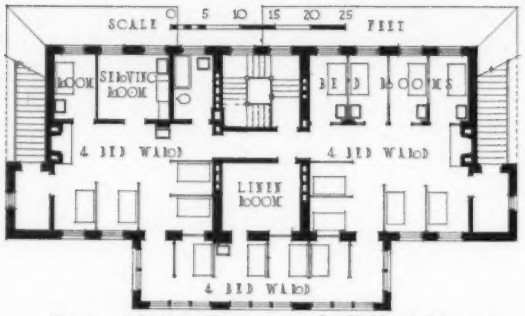


Fig. 8. Admitting Department of a Children's Hospital

With the larger units, however, it is often found that the upper floor will function better, and in many cases a separate building may be provided, but wherever located, certain elements are necessary:

Operating room.
Sterilizing room.
Anesthetizing room.
Nurses' workroom.
Surgeons' room.
Surgeons' scrub-up.

These may be increased as necessity dictates, and the number of rooms must be governed not by the number of patients in the institution but by the number of the staff who wish to operate at the same time. It will be noticed in the great hospitals of Europe that the operating rooms are fewer in number than in institutions the same size in the United States. In illustration of this point may be given a few notable examples: the Virchow at Berlin, with its 2,000 or more patients, a large percentage of whom are surgical, has but four operating rooms, one of them for known septic cases; in the Munich-Schwabing, with 1,000 beds, there is but one for clean operations. In this country, on the other hand, we find in many comparatively small hospitals a much larger number of operating rooms. In the Massachusetts General Hospital (not including Phillips House, which is a hospital in itself) with 250 beds, there are five operating rooms besides those in the accident and orthopedic departments; the Grace Hospital at Detroit has four operating rooms, besides surgical dressing rooms; in the Youngstown Hospital, with 150 beds, four operating and two accident rooms are provided; the Peter Bent Brigham Hospital in Boston, with 225 beds, has three operating rooms, and the Bridgeport Hospital, with 200 beds, has three operating rooms.

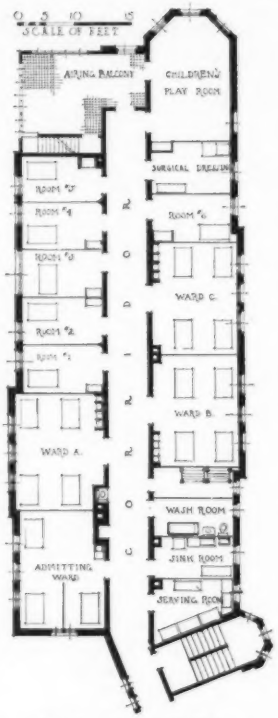


Fig. 9. Children's Wing Henry Heywood Hospital Gardner, Mass.
Edward F. Stevens, Architect

An operating room for general operations need be no larger than 16 x 20, or having from 300 to 350 square feet. Anything beyond this, excepting for observation space, is waste of room. The day of the amphitheater for operating has gone as a method of teaching, and in clinical hospitals the students are grouped around the operator or upon raised platforms or seats which may be moved from one position to another. Where students attend operations it is desirable to provide separate approaches to the observation stands or platforms, either by narrow corridors, as shown in the plans of the Geisinger Memorial Hospital (Fig. 10) and the City Hospital, New York (Fig. 11), where the student or visitor enters the operating room at the rear, or, as in the case of St. Mary's Hospital at Rochester, Minnesota, where the visitor enters from a mezzanine story. Because of the likelihood of condensation, the placing of glass between the observer and the operator does not always give the best results. The Polyclinic in Rome and the Bispebjerg in Copenhagen are two examples of operating rooms treated in this way.

The important item in operating room construction is the lighting. A direct north light is desirable, and it has been found that the vertical window, extending far enough above the normal height of the ceiling to give a direct light, has proved very satisfactory and is largely replacing the skylight. For artificial lighting, most surgeons prefer a diffused light, and this can be obtained by the placing of four, six, or more semi-reflecting ceiling lights on either side of the operating table, but not over the table. Every hospital of any size should have at least one operating room which may be darkened for eye work, and a small room set aside for plaster work is almost an economic necessity.

Where the plan will permit, the anesthetizing rooms should join the operating rooms. Authorities differ as to the location of the sterilizing rooms. If there are but two operating rooms, a position between the two is quite desirable. If there are many, a small instrument sterilizer in the operating room may be desirable; if the work is to be done in one room, several sterilizers may be used. The bulk sterilizing of dry goods may well be done out of the operating area. The water used in the operating room may be rendered sterile by repeated boiling or distilling. The writer believes that this can be best prepared outside the operating suite and conducted

in tin-lined pipes to re-heaters and dispensed in each operating room and wherever needed in the hospital.

While it is true that many surgeons advocate that the "scrubbing up" before operation be done in the operating room, what seems to be more satisfactory in many cases has been to set apart a portion of the corridor or an alcove from the corridor for this purpose. This leaves the operating room free for strictly surgical purposes. With the sterile water tap for occasional rinsing, the need of the large scrub-up basin in the operating room is avoided.

In the nurses' workroom should be space for making up surgical dressings, the cleaning of instruments, scrub-up provision for the nurses, and the general workroom of the department. In the surgeons' room should be the private lockers for the clothing of the operating staff, comfortable chairs, toilets and showers. The surgical instruments may be kept in a separate instrument room or in cabinets in the operating rooms or corridor.

The Library. Too little thought is usually given to provision of reading matter for the patients. In some hospitals provision is made for the hospital library, and books are brought to the patient; in others, portable bookcases on wheels, upon which the books and magazines are arranged, are wheeled to the bedside and the patient given the opportunity to make a selection from the library shelves.

For a patient weakened by sickness the bound book or the magazine with its large proportion of advertising matter and its stiff binding is often too heavy to hold, and the writer believes this problem has been nicely solved by an ex-patient and member of the Ladies' Board of Managers of a New England hospital by making careful selections of single stories from magazines, cutting them out and neatly enclosing them in stout covers with the name of the story, its author and the magazine from which it was taken. These she has named the "*Pass It On*" library. If there is a social service worker in the hospital, the library may well be left in her hands, as it will give additional opportunity for more intimate conferences with the patient.

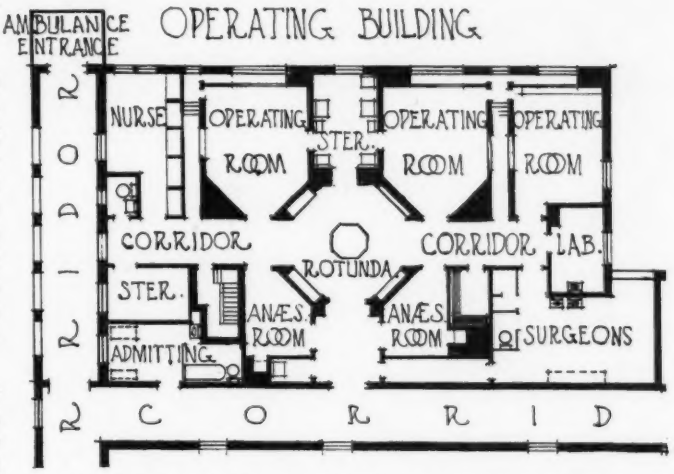


Fig. 10. Operating Department, Geisinger Hospital, Danville, Pa.
Edward F. Stevens, Architect

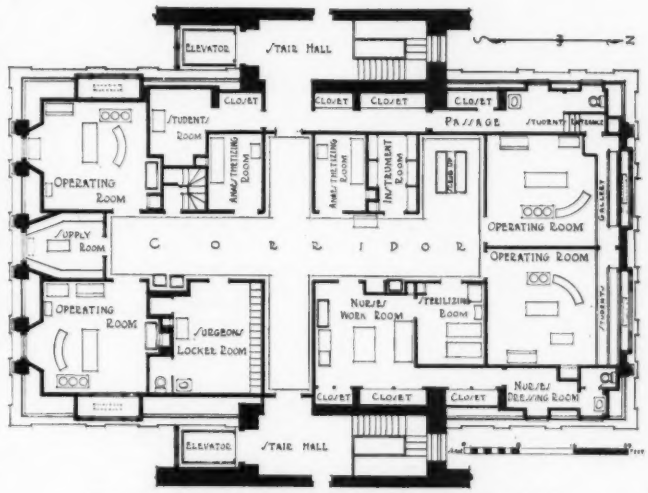


Fig. 11. Operating Department, City Hospital, New York
Charles B. Meyers and Edward F. Stevens, Architects

Administration Quarters. The administration has been considered last—not that it is the least important, but because the hospital is primarily built around the patient. We have considered most closely that portion of the hospital concerning the patient and his immediate welfare while he is in the hospital, and the administrative portion is the last place he visits when he is leaving and paying his bill. We find the administration unit in nearly every part of the hospital, but where planning will permit, a central location is desirable. It is in this section that inquiries are made, the consultations held, and the general machinery of the hospital directed, so that a central location is most convenient.

Upon the size of the hospital depends the size of the administration unit, for here not only the bookkeeping and accounting are done, but here also are located the headquarters of the superintendent, the superintendent of nurses, and the social service worker. Here the directors of the hospital will hold their conferences; here the information desk and the telephone switchboard, the staff rooms and the hospital library are located. Under some circumstances a separate building for the administration will function to the best advantage and may be combined with the housing of the internes, lecture rooms, etc.; but where the strictest economy must

be maintained, it is generally found that a portion of the entrance floor of the hospital can best be utilized.

In the Ottawa Civic Hospital the administration unit is developed in the center of the H-shaped building (Fig. 13), and owing to the fact that two lines of service for the building are designed at the crossing of the pavilions, the center portion of the entrance floor need never be made a thoroughfare for the wards in the east and west pavilions. Another small unit is shown in the Brandon General Hospital.

If the hospital chances to be a memorial building, where the memorial feature should be emphasized, this emphasis can be made in the entrance to the administration unit by a larger and more spacious room, with space for tablets and other architectural features.

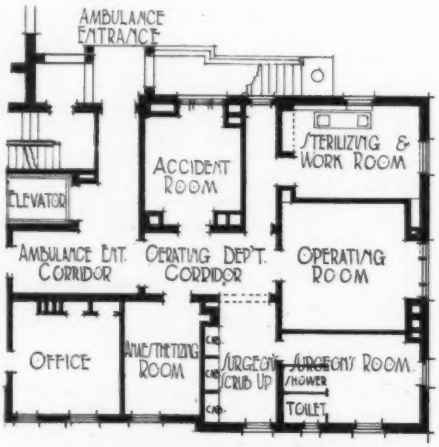


Fig. 12. Small Operating Department, Mary Lane Hospital, Ware, Mass.
Edward F. Stevens, Architect

Intercommunicating Means in Hospitals. With the type of ward or private rooms determined upon and the service portion planned to function for these wards, an important part of the plan is the intercommunication, not only between one section and another, but between wards and corridors and between one room and another. In planning the hospital, we should always bear in mind that the patient is being taken through these corridors and wards, not as we would walk through a hotel but either on a stretcher or, more likely, on the hospital bed. For that reason the width of the corridors must be such that a bed which is 6½ feet long and diagonally something over 7 feet may be turned within this corridor. The doors to all of the patients' rooms should also be of sufficient width for these beds to pass through. Nearly every bed is at least 3 feet wide. There are projections on the bed which would make necessary an additional 2 or 3 inches, so that for doors entering the wards and private rooms 3 feet, 8 inches or 4 feet is none too much for easy communication.

The approach to the elevator is just as important, and the elevator itself should be made sufficiently large to take the bed with its attendants. Likewise the doors of the elevator must be wide enough for the passage of this bed.

If, as often happens in the adding of new buildings to old, a change of level is necessary from one portion of the building to the other, this should always be managed by ramps and not by stairs, and these ramps should be with not over 5 to 8 per cent rise.

Operating Room, Maternity Hospital, Bridgeport, Conn.
Edward F. Stevens, Architect

Service. Kitchen. The three important elements in the care of the patient outside of housing, medical and nursing care, are to properly feed, warm and provide him with clean linen. Provision for these may or may not be located within the main buildings of the institutions, but the kitchen, at least, should be sufficiently near to make the dispensing of palatable food possible.

With gas, steam and electricity at hand and the vast variety of labor-saving devices for preparing food, there is no excuse for food improperly cooked or served. The kitchen must be planned for economic service from the receiving of raw supplies to the service of the patients' trays. Plan the kitchen as you would a factory for the conversion of the raw products to the palatable food. Avoid "cross currents" of service; don't mix the washing of pots and pans with the making of "puff paste," and when the food is ready to be served it should reach the patient quickly without deterioration. Steam tables, toasters and cookers, food carriers and dishwashers of approved pattern, are all important factors. Not only the reception and preservation of food supplies are necessary, but the hygienic disposal of the garbage and refuse must be considered.

In the illustration of the Quincy Service Building (Fig. 14) the method shown for the disposal of "waste product" provides for (a) An incinerator connected with the heating flue and ap-

GENERAL EXTERIOR VIEW

BASEMENT FLOOR PLAN

FIRST FLOOR PLAN

BRANDON GENERAL HOSPITAL, BRANDON, MANITOBA

STEVENS & LEE, ARCHITECTS

DAVID MARSHALL, ASSOCIATE ARCHITECT

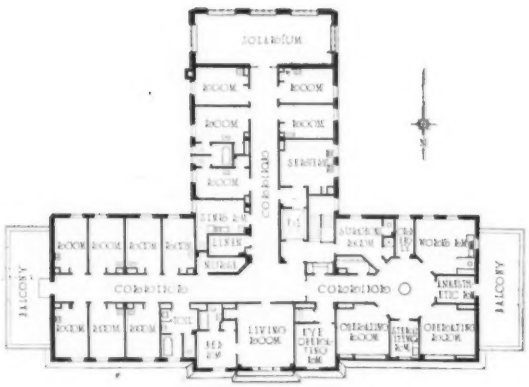
BRANDON GENERAL HOSPITAL
BRANDON, MANITOBA

Illustrations on Plate 95

Type of construction. Fireproof
Exterior walls. Brick veneer with tile backing
Roofs. Felt and gravel
Floors. Terrazzo, cement and linoleum
Heating. Forced hot water
Ventilation. Fans for kitchen and toilets; wards by gravity
Windows. Double sliding (box frames with four sashes)
Area of building. 11,000 sq. ft.
Cubage of building. 473,200 cu. ft.
Date of general contract. May, 1921
Cost of building proper. $275,930
Cost per cu. ft. 58⅓¢
Number of beds. 70
Cubic ft. per patient. 6,770
Cost of operating per day per bed. $2.45

This construction includes kitchen. Laundry and boiler room provided in separate building.

SECOND FLOOR PLAN



THIRD FLOOR PLAN

proached from an independent passage where all hospital refuse may be incinerated; (b) provision for the temporary "housing" of what is called "garbage" in a section of the main refrigerating area in such a way as to prevent its disintegration.

In transporting the food from the kitchen to the patient, the modern insulated food carrier is used to advantage. In the service building would be located the dining rooms, the serving rooms and food storage, hot and cold. A refrigerating plant is not only desirable but is an economic factor. The teaching of dietetics may be in the main kitchen or in a laboratory in the nurses' home.

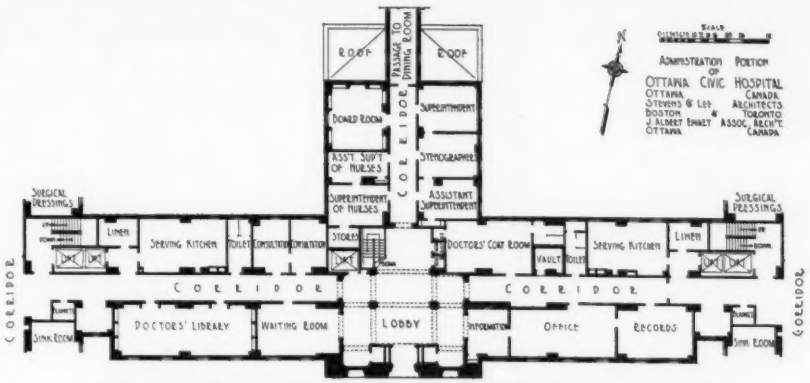


Fig. 13. Administration Department, Ottawa Civic Hospital, Ottawa, Canada
Stevens & Lee, Architects; J. Albert Ewart, Associate Architect

Laundry. The location of the laundry must be determined by the needs of the institution, the available space, and the quantity of work to be accomplished. In a hospital on a restricted site, the laundry, if well ventilated, may be placed within the hospital area; but where space permits, it is desirable to have this work done in a separate building. This may be often done to advantage, as in the case of the Quincy City Hospital (Fig. 14), where a service building is provided in connection with the kitchen and heating plant.

The "wet work" of washing, starching, extracting, etc., should be kept by itself and should be so arranged that the clothes will pass readily from one machine to another,—from the washer, extractor, flatwork ironer, drying tumbler, steam press and ironing boards, on to the clean linen room. In the "wet" portion, the floors, of course, must be of some moisture-resisting material, but in the section where the ironing is done it is important that a resilient floor be provided.

Heating Plant. With small plants, the heating may well be placed in the main building, but with an increase in the needs of this department not only for heat but for cooking, sterilizing, ventilation, and often for power and refrigeration, it becomes desirable to make a separate building which may function as a heating plant or in combination with the kitchen and laundry, as at Quincy (Fig. 14). With the three sections of this hospital service, high pressure steam is the main element used. The electric plant and the refrigerator plant may both come within this unit. The location of the heating plant, with its necessarily smoke-giving chimney, should be considered in reference to the prevailing winds.

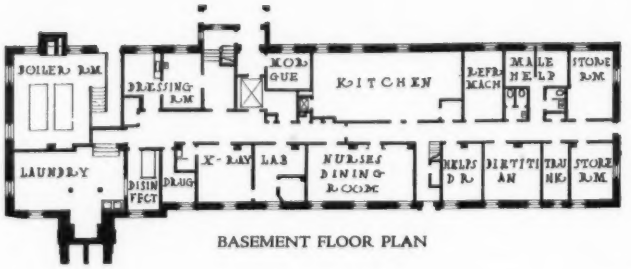
First Floor Plan

Second Floor Plan

Fig. 14. Service Building, Quincy Hospital, Quincy, Mass.
Stevens & Lee, Architects

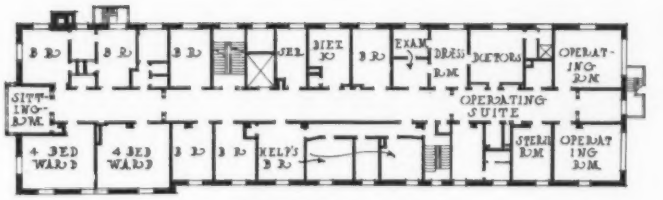
THIS hospital possesses particular interest as being an excellent example of its class. Built with a view to enlargement, it is so planned that a wing of the same size as that already built can be erected on the opposite side of the entrance pavilion, considerably more than doubling the hospital's capacity, since the present administrative departments are sufficient for a much larger hospital.

Built of brick and of fireproof construction in 1918 at a cost (excluding equipment) of $217,055, the hospital contains a cubage of 458,000 cubic feet —about 46½ cents a foot, and accommodates 100 patients.

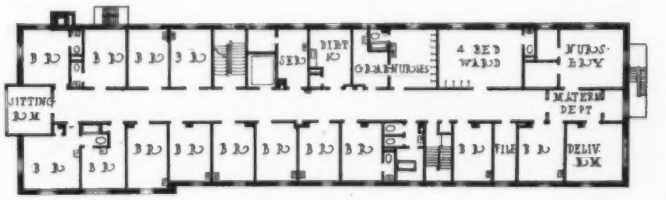


BASEMENT FLOOR PLAN

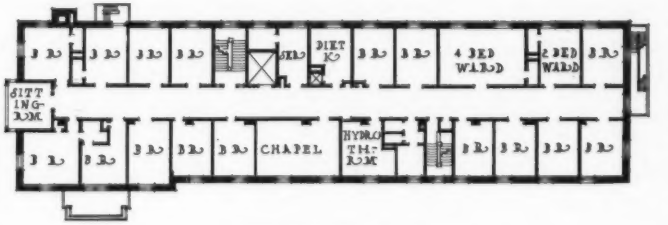
ENTRANCE PORCH



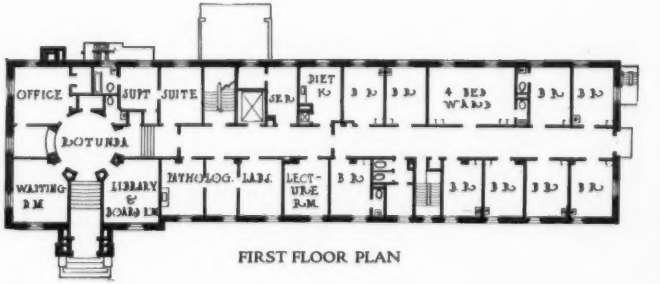
FOURTH FLOOR PLAN



THIRD FLOOR PLAN



SECOND FLOOR PLAN



FIRST FLOOR PLAN

ST. LUKE'S HOSPITAL, DAVENPORT, IA.

TEMPLE & BURROWS, ARCHITECTS

Some of the Special Departments of a General Hospital

By WILEY EGAN WOODBURY, M.D.
Director, Fifth Avenue Hospital, New York, and Consultant on Hospital Construction

NOTHING in the designing of the modern hospital of today is greater in importance than the early consideration of the needs of a community, and this requirement will likewise play an important part in the planning and arrangement of the special departments and rooms of a general hospital.

Before attempting to outline and locate these units, one should have a definite idea of the kind of service required to meet the needs of the particular hospital in question, and even this will not be sufficient unless the relationship between all departments is thoroughly understood. It is a well known fact that unless one clearly visualizes in the blueprint every procedure in connection with the care of a patient, the several departments, when constructed, will not function to the best advantage.

The magnitude of the subject will of necessity limit these remarks to a brief outline of the special departments in question, but it is to be noted that the necessary details, purposely omitted from the text, are found in accompanying sketches of floor plans of typical large and small installations.

The biological laboratory of the general hospital is more closely related to all the patients' departments than is any other of the special departments. The modern hospital provides something more than the means of curing disease, and for this reason we first turn to the laboratory for guidance in the care of patients. This general demand for service necessitates the selection of a readily accessible location, preferably one providing light on at least three sides; whether this be in a separate unit, as is frequently the case in the pavilion type of hospital, or in one of the wings of the cubicle type, is not important. In selecting the location, however, there are many points to be considered. Providing for future expansion will always be a problem. Proper facilities must be provided for the care of animals used in connection with laboratory work. Any oversight relative to these requirements will always prove embarrassing.

Fig. 1. Pathological Laboratory, Mount Sinai Hospital, New York
Arnold W. Brunner, Architect; S. S. Goldwater, M.D., Consultant

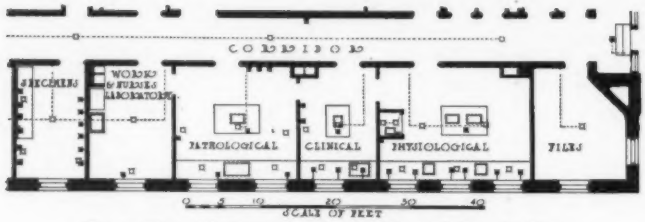


Fig. 2. Plan of Laboratories, Beverly Hospital, Beverly, Mass.
Haven & Hoyt, Architects

The floor plans designated as Fig. 1 are particularly well adapted to the large institution, and while in this instance the laboratories are located in a separate pavilion, the general scheme lends itself quite readily to the hospital of cubicle type. In many of the smaller institutions a tendency is noted to place the laboratory on the first floor or in the basement, and frequently this department is operated successfully on the upper floors. When there is a comparatively large outpatient department, with diagnostic clinic located in the basement, it is advisable to arrange for the laboratory near by, but if this feature is not to be considered, there is no reason the upper floor site should not be favored. The plan presented in Fig. 2 provides for all of the well recognized laboratory features, and appears to be well adapted to the needs of the small general hospital. In this plan the laboratory is in the basement.

The X-ray department plays an important part in the diagnosis and treatment of disease. In the planning of this department, the rapid progress which is being made in connection with the use of the Roentgen rays brings to light no end of complications. The question of location involves a far more serious problem than that of accessibility to the patients' departments. Heretofore, construction for the protection of the operator has been planned, but with the advent of the deep therapy machines the problem must be considered of protecting other persons in adjoining rooms from the injurious effects of the ray. Some authorities continue to rely on the use of lead for insulating purposes, by simply increasing the thickness of the sheet and expanding the areas to be covered, while others, in addition to using the lead sheets and in order to secure the advantages of atmosphere as an insulating agent, advocate the use of a separate building. It is too soon, however, to form any definite conclusions regarding this particular phase of the question of location, but in any event one should not be unmindful of the dangers involved.

The plan designated as Fig. 3 shows an X-ray department well adapted to the needs of a large hospital, while Fig. 4 is recognized as better suited to the smaller institution.

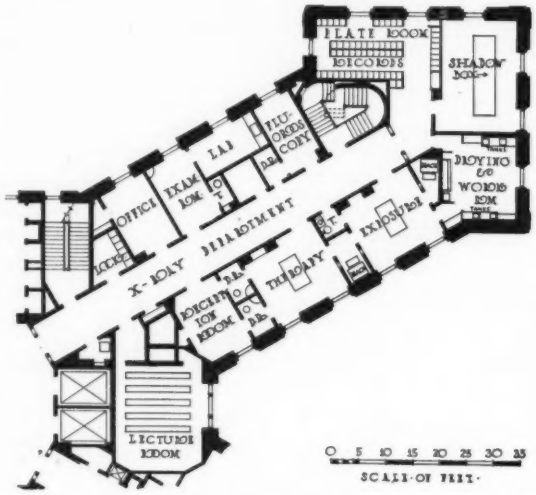


Fig. 3. X-ray Department of Fifth Avenue Hospital, New York
York & Sawyer, Architects; Wiley E. Woodbury, M.D., Consultant

The Maternity Department. In no other single department is encountered the combined difficulties of serving both the adult and the infant. The maternity department of the modern hospital is in reality a hospital within itself, and the person responsible for the planning of the unit will do well to keep this thought foremost in mind. It is in this department that the prenatal care of both mother and infant must be arranged. The necessary attention during the first two stages of labor, the delivery room service at time of birth, and the many phases of after-care for both mother and child are all equally important. No other service in the hospital combines so many problems.

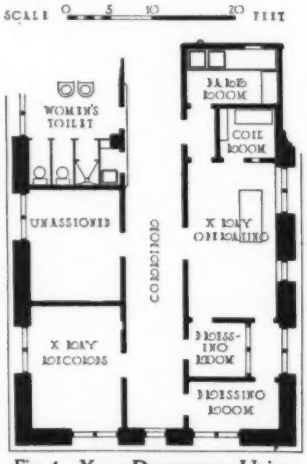
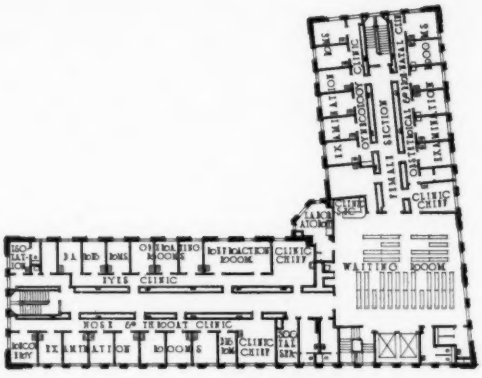
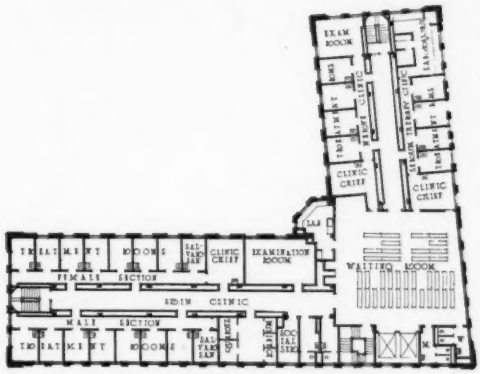


Fig. 4. X-ray Department, Union Benevolent Hospital, Grand Rapids
York & Sawyer, Architects

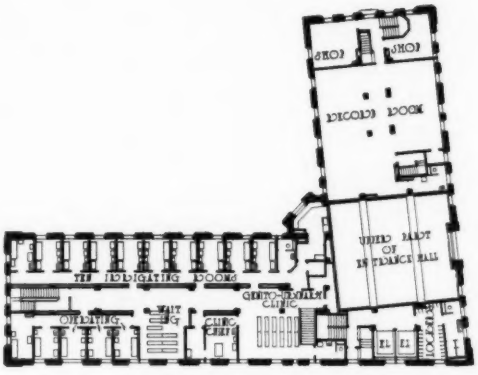
For obvious reasons details must be omitted, but it is desirable to emphasize these points: The pre-natal care of the newly admitted patient demands privacy, quiet and pleasing surroundings, and only in the carefully arranged private room may this aim be accomplished. Special attention should be given to the color scheme; glaring white walls and white enameled furniture are suggestive of sickness. The modern hospital inclines to use of the cheerful tints of buffs and tans; in short it provides a room that resembles as nearly as is practicable in hospital service the bed-



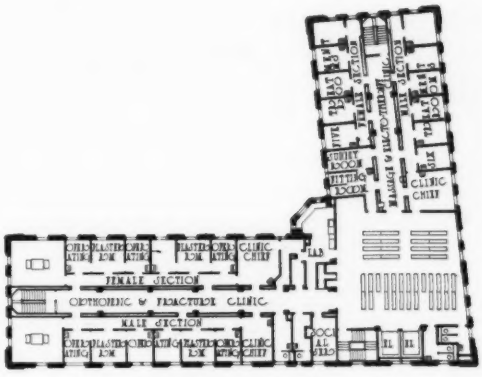
FIFTH FLOOR PLAN



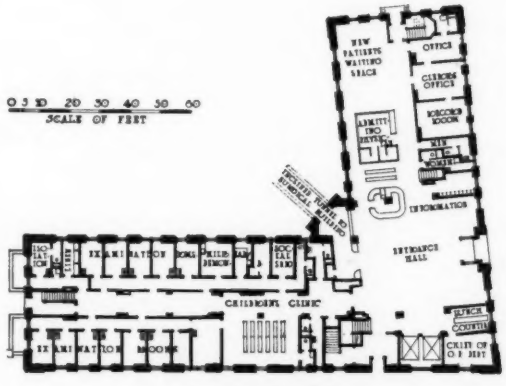
SIXTH FLOOR PLAN



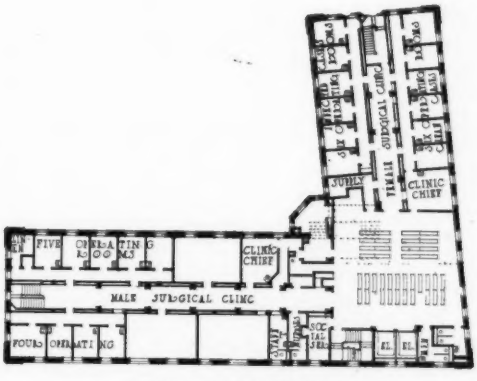
MEZZANINE FLOOR PLAN



THIRD FLOOR PLAN



FIRST FLOOR PLAN



SECOND FLOOR PLAN

Fig. 9. A highly developed out-patient unit occupying seven floors. The fourth floor (not shown) is devoted to the medical clinic and is similar in general arrangement to the third floor

OUT-PATIENT DEPARTMENT, BOSTON CITY HOSPITAL, BOSTON

COOLIDGE & SHATTUCK, ARCHITECTS

room of the well kept private home.

In order to insure quiet, one should arrange for the segregation of the three classes: viz., the newly admitted patient; the mother in labor, and the new born infant. The plan presented plainly shows just how this has been accomplished in the Fifth Avenue Hospital, New York. The newly admitted patient is placed in a single room on the front side of the building, while the labor rooms which have been treated with a sound-deadening material are located in a rear wing, adjoining the preparation and delivery rooms. The nurseries, which have also been treated with sound-deadening material, together with isolation rooms, superheated rooms for prematurely born infants, steam heated linen supply closets, bathrooms and isolation units for infants, occupy a rear wing opposite the labor rooms just mentioned. The supervisor's office, visitors' reception room, service pantry, elevators, etc., are located in the center of this unit. The accompanying plan (Fig. 5) shows a completely equipped department of 35 beds, each patient occupying a single room.

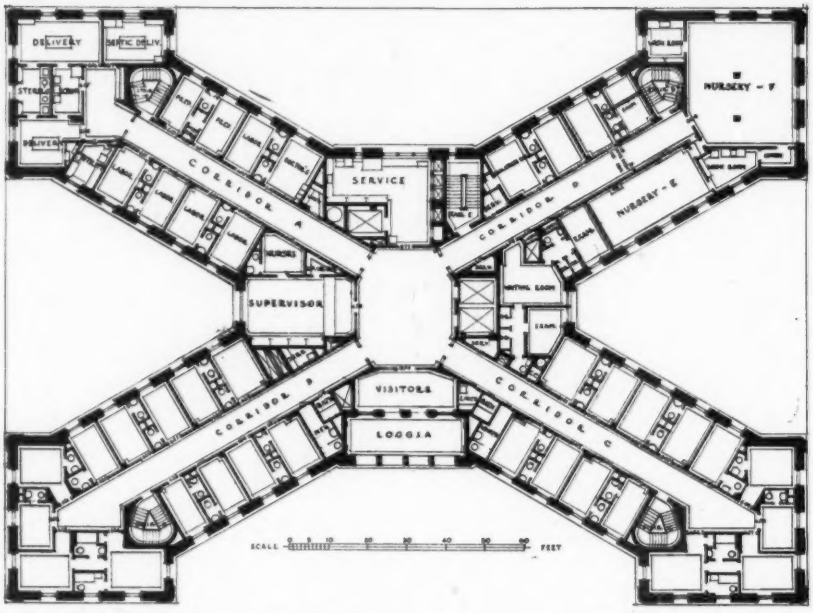


Fig. 5. Maternity Department Plan, Fifth Avenue Hospital, New York
York & Sawyer, Architects; Wiley E. Woodbury, M.D., Consultant

Orthopedic Department Workrooms. The special workrooms used in connection with the orthopedic department are generally located in the basement, although occasionally it may be practicable to place them in a detached building. The plan submitted (Fig. 6) gives a good idea of space requirements for these: the brace shop, equipped with the different kinds of mechanical appliances; the forge shop; the polishing and grinding room; the leather room; the stock room and the general store room and office.

Hydrotherapeutic Department. Although the idea of the "water cure" found its inception in the medicinal pools of biblical times, it remained for the German scientists to develop the school of Hydrotherapy. That this form of treatment found favor in certain parts of Europe is evidenced by the prosperity attained by some of the famous watering places of Germany, and no doubt this feature is largely responsible for the strenuous efforts that have been made to establish similar institutions in America. The general hospital can not carry out hydrotherapeutic treatment on so large a scale, and for this reason one must turn to the several types of mechanical devices for whatever aid is to be obtained from hydrotherapy. Charlatanism and quackery practiced in connection with the use of this well recognized therapeutic agent are largely responsible for its lack of popularity in general hospitals, but in the hands of the well trained, honest practitioner of internal medicine, hydrotherapy means something real, and the completely equipped modern hospital will do well to provide a special department for this work. The plan included here (Fig. 7) conveys a good idea of the requirements of floor space for the several pieces of equipment.

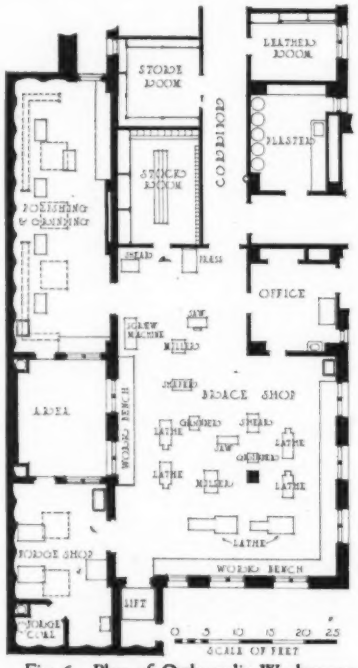


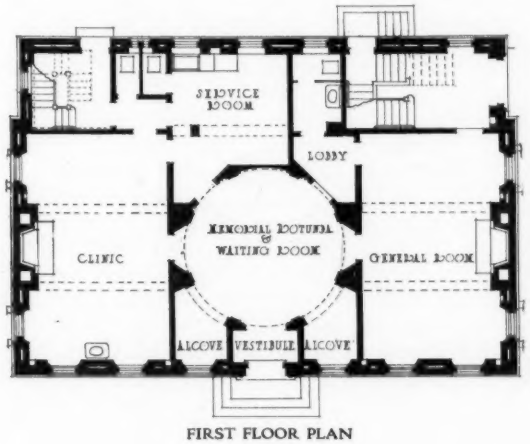
Fig. 6. Plan of Orthopedic Workrooms
York & Sawyer, Architects

Isolation Department. The location of the isolation department of the general hospital may be largely governed by local

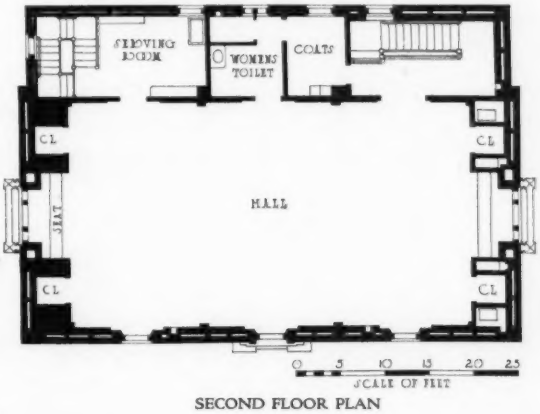
(Continued on page 276)

GENERAL EXTERIOR VIEW

THIS building is a clinic for the treatment of infants. It has no beds, private rooms or ward service, and is intended for the use of out-patients only. Brick is used for the exterior walls, and the construction is fireproof, excepting the roofs which are of wood and covered with slate. Floors are of concrete; heating is by indirect and direct steam; ventilation is of the gravity type, and wooden sash are used at the windows. The clinic, built in 1922, contains 2,110 square feet, and cost (not counting equipment) $41,229, or 63 cents per foot for 65,400 cubic feet.



FIRST FLOOR PLAN



SECOND FLOOR PLAN

PINKHAM MEMORIAL CLINIC FOR BABIES, SALEM, MASS.

HAVEN & HOYT, ARCHITECTS

health laws. In some communities the city health ordinances require that the isolation department be placed in a detached building. Others permit the use of a portion of a building, providing that the only communication therewith is from the outside. In still other communities a single room or series of rooms well isolated from the patients' departments will serve all of the ordinary purposes of an isolation unit.

It seems desirable to point out that the needs for an isolation department are so many and so varied in the different communities that one should have a comprehensive idea as to the requirements of service and the provisions of the sanitary code before attempting to suggest a location for this unit. When it is to be used for the temporary isolation of an infected case, pending immediate transfer to a contagious disease hospital, then the elaborate structural efforts of the past are not required, and the properly isolated single room is sufficient. But in the case of the general hospital serving a community which does not provide a special contagious disease hospital, an isolation unit should be provided, either detached from the main building or so placed that natural isolation of the building is insured. The accompanying plan (Fig. 8) represents a highly developed isolation unit in a detached building.

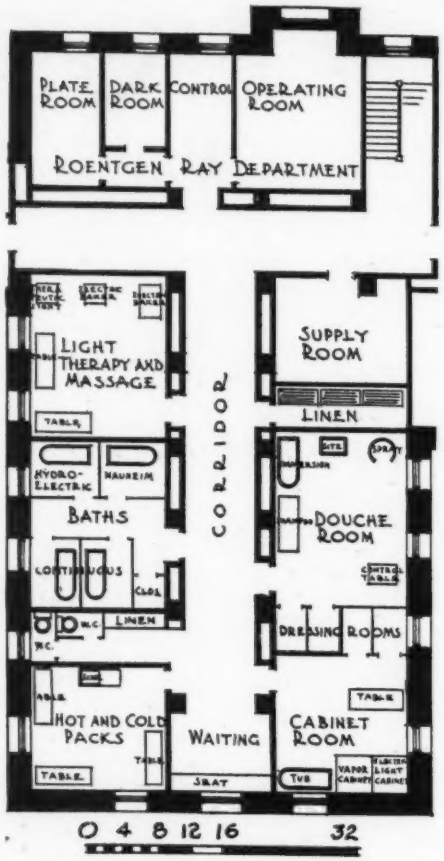


Fig. 7. Plan of Hydrotherapy Department, Ross Pavilion, Royal Victoria Hospital, Montreal
Stevens & Lee, Architects

The out-patient department with modern facilities for diagnosis enables the hospital to reach countless numbers who might otherwise be unable to secure medical attention.

In connection with the location of the out-patient department it seems desirable to point out that one of the first persons to be considered is the out-patient himself. The ideal plan for the large hospital calls for a completely equipped unit in a separate building, readily accessible to the highway and to the hospital proper, and so located that natural ventilation and sunshine may be had from all quarters. The entrances and exits for patients should be arranged so that this group will not come in contact with the hospital proper.

The foregoing description refers to the completely equipped unit; that is, one possessed of all of the diagnostic facilities to be found in a modern hospital. But when for reasons of economy it is desirable to omit from the out-patient unit some of the diagnostic departments, such as X-ray, laboratory, etc., the hospital facilities must be properly utilized, and the question of location is influenced accordingly.

In the past an attempt has been made to confine this department to the lower floors, but owing to the demands for increased floor area and because of lack of ground space some of the large hospitals have found it necessary to erect higher buildings, utilizing all floors. This radical change in plan of construction is necessary in certain instances, but it is a fact that when the lines of travel are modified in this manner, that is, the horizontal plane is shortened and the perpendicular line is lengthened, the costs of construction and maintenance are materially increased. The fact should be kept in mind that the out-patient department is called upon to handle a large number of people in a comparatively short period of time, and the problem of transportation is made more difficult when the lines of travel, as just indicated, are changed.

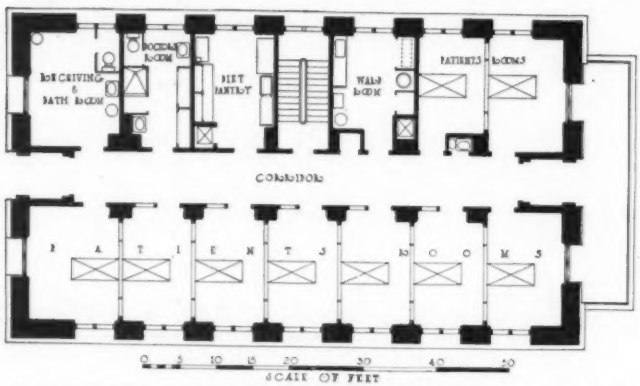
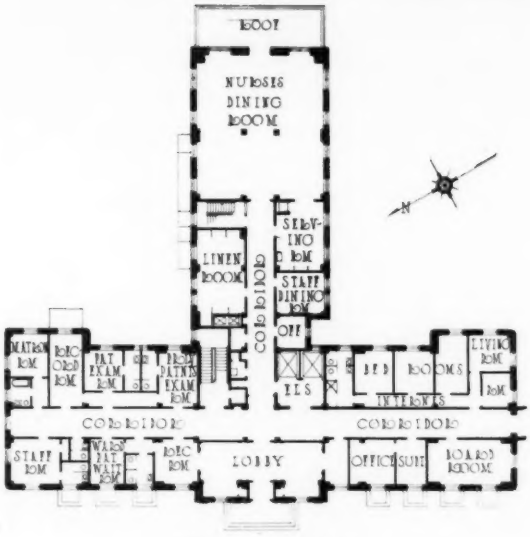


Fig. 8. First Floor Plan of Isolation Building, Rockefelleer Institute for Medical Research, New York
York & Sawyer, Architects

PERSPECTIVE VIEW OF EXTERIOR



FIRST FLOOR PLAN

SECOND FLOOR PLAN

HACKENSACK HOSPITAL, HACKENSACK, N. J.

CROW, LEWIS & WICK, ARCHITECTS

HACKENSACK HOSPITAL
HACKENSACK, N. J.

Illustrations on Plate 96

Type of construction. Fireproof
Exterior walls. Brick and limestone
Floors. Marble, tile, terrazzo, linoleum
Heating. Direct steam
Ventilation. Natural
Windows. Double-hung transom sash
Area of building. 66,000 sq. ft.
Cubage of building. 950,000 cu. ft.
Date of general contract. 1922
Cost of building proper. $700,000
Cost per cu. ft. 73⅔¢
Number of beds. 121
Cubic ft. per patient. 7,851
Cost of operating per day per bed. $4 (approximately)

This construction includes kitchen located in basement. Laundry and boiler room provided in other buildings.

TYPICAL FLOOR PLAN

SIXTH FLOOR PLAN

Essential Equipment for the General Hospital

By WILLIAM D. CROW, A.I.A.
Crow, Lewis & Wick, Architects, New York

IN the equipment of a hospital certain provisions must be made to afford a sufficient measure of safety to the patients and to provide for their comfort and, no less important, to make certain that the work of the nurses can be performed with a minimum of effort and time. Comparatively simple equipment will meet these requirements to a reasonable degree, and entirely adequate equipment need not run into great elaboration. It is advisable to make sure that unnecessary equipment is not installed, not only to save the first cost, but to avoid the maintenance cost and use of space which installation of such equipment would entail.

The Ward Unit. Each average ward of 24 beds should have a nurses' station, a chart room if possible, diet or serving kitchen, nurses' duty room or sink room, toilet and bath facilities for patients, and one or two quiet rooms for patients who must be removed from the wards for any reason. These adjuncts to the ward, in an economical plan, require a greater width than is necessary in the ward and should be grouped at the entrance end of a ward building. It is most convenient to place the duty room and patients' toilets nearest the ward, so that the traffic to them will not penetrate far into the central corridor and mix with other circulation.

As the dimensions of a building affording a good ward plan vary considerably from those of a building best suited for a private room plan, it is desirable when possible not to attempt to combine the two services in one building, although it is not possible often to so dissociate them. When this is the case some compromises must be made. Wards and semi-private rooms can be put in the same building without disadvantage, as the same dimensions of building and generally the same service arrangements are appropriate, excepting that an additional patients' toilet room will be required.

Nurses' Station. The station should have a position commanding a view of the ward and preferably be elevated a step to give a better view. The nurses' station should be outside of the ward so that the nurse can sit in a comfortable temperature when that in the ward is low during the night. The equipment should be a nurse's desk, enameled steel with drawers and with two side pedestals, one with grooves into which the chart boards can be slid and the other pedestal with shelves for dressings trays, set up ready for immediate use.

A cabinet is necessary at the nurses' station for medicines and routine supplies. The cabinets should be made deep enough to hold flasks and dressings and should have doors with locks. A sink under the cabinet is a convenience, but need not be provided. A lighting bracket above the nurse's desk or a receptacle for a portable desk lamp is necessary, and a pilot light of the signaling system should be placed directly before the nurse a little distance above the desk where it can be plainly seen. Outlets for exterior and interior telephones should be placed at the nurses' station. The chair should be comfortable and of wood; an enameled iron chair of an uncomfortable pattern is not necessary.

Signal Systems. While signaling can be done by systems of bells or annunciators or combinations of both, operated from push-buttons at the patients' beds, prevailing practice is to install one of the several good silent electric light systems now on the market. No system requiring current of above 10 volts should be installed because of the danger to the patient if he should accidentally receive a shock at a greater voltage from some defect in the push-button and flexible connector under his pillow.

In a usual installation, an outlet is provided on the wall at each bed location, from which a flexible cord conductor with push-button is run to the patient's bed. In wards or semi-private rooms it is desirable to have a small lamp on the signal circuit in each wall-set so that the point of origin of the call can be determined by the nurse when she enters the ward. The calling station, at the patient's bed, should have a push-button or other device, varying with different manufacturers, which is the only means of opening the signal circuit after the patient has sent in a call. This arrangement insures

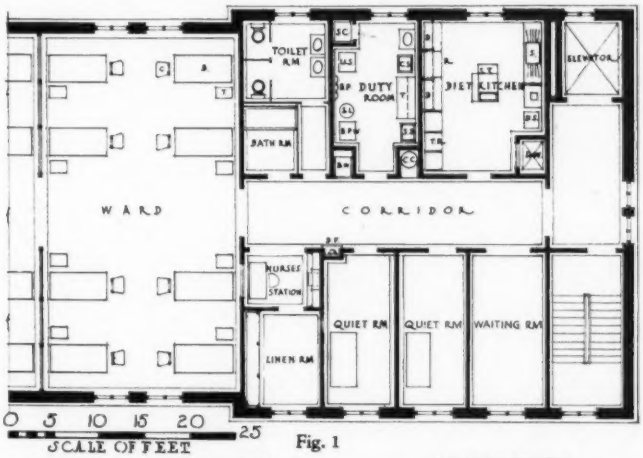


Fig. 1

WARD
B. Bed
T. Bedside table
C. Chair

DUTY ROOM
S. C. Specimen closet
U. S. Utensil sterilizer
B. P. Bedpans
S. L. Soiled linen bag
B. P. W. Bedpan warmer
C. S. Clinic sink
T. Marble table and shelf over
S. S. Slop sink
C. C. Clothes chute.

DIET KITCHEN
D. Dresser
R. Refrigerator
T. R. Tray racks
S. T. Steam table and gas plate
S. Sink
D. S. Dish sterilizer
D. W. Dumbwaiter

a visit of the nurse to the patient's bedside, all signals remaining lighted until this visit has been made. The resetting device should be of such a nature that it cannot be operated accidentally by a patient, thus canceling the call, nor should it be an arrangement which requires the nurse to use a key to open the circuit. A receptacle, on the full voltage lighting circuit, can be installed next to the signal outlet and under the same plate and will afford the current necessary for a hand lamp, table lamp or heating pad.

The calling stations described are wired so that the pressing of the extension push-button by the patient will light a lamp in the corridor over the door to the ward or room in which the call originates, and it will also light pilot lights at the nurses' station, duty room, diet kitchen and other places where the nurse may be expected to spend any time away from her station. The lighting of the pilot light directs the attention of the nurse to the fact that a call has been made, and by passing into the corridor she can determine the source of the call by the lighted signal over the door of the room or ward. In the case of divided wards, one unit of which is shown in Fig. 1, a signal lamp for each division, as well as a lamp over the entrance to the ward, aids the nurse in locating the call. Signal lights are made with buzzers attached, causing either momentary or continuous ringing, and these devices are useful under some circumstances where an audible call is needed, but, as the silence of a light signal system is one of its chief points of value, the buzzer attachments should be used sparingly. The light signal system can be equipped with an illuminated annunciator over the nurses' station for each floor, and, further, the signal systems of all floors can be connected to an illuminated annunciator in the main office. The addition of the annunciators at the station adds nothing to the value of the system and does add somewhat to the cost. The general annunciator in the office affords a check upon the promptness of the nurses in answering calls, but it involves a considerable additional expense in many cases, and would not be particularly valuable where the supervision is thorough.

Nurses' Station, Evanston Hospital, Evanston, Ill.
Richard E. Schmidt, Garden & Martin, Architects

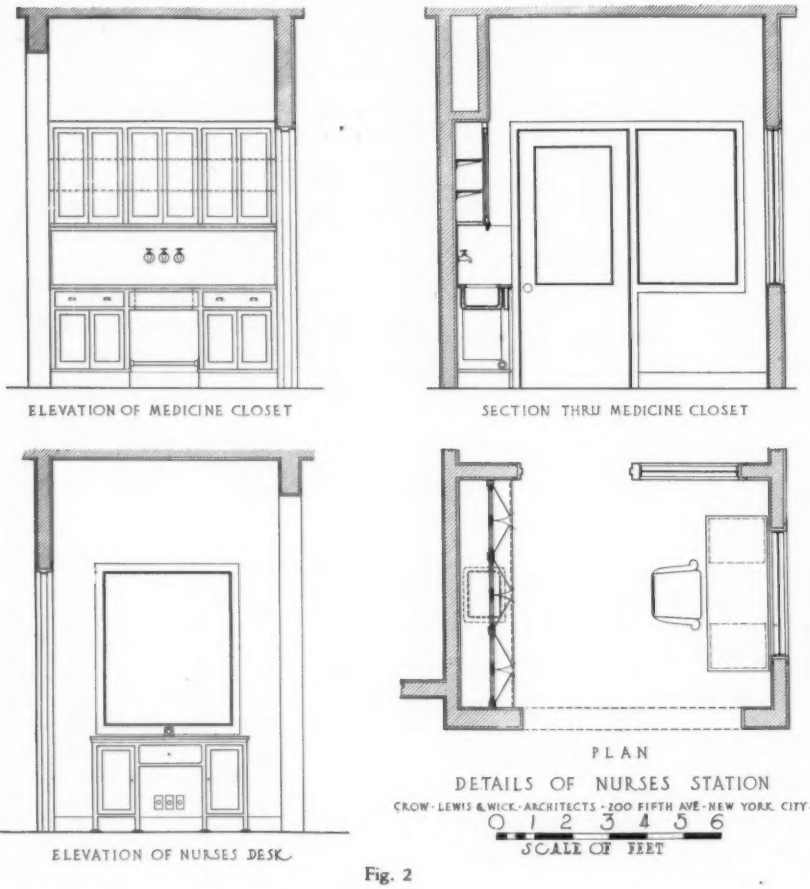

ELEVATION OF MEDICINE CLOSET
SECTION THRU MEDICINE CLOSET
ELEVATION OF NURSES DESK
PLAN
DETAILS OF NURSES STATION
CROW · LEWIS & WICK · ARCHITECTS · 200 FIFTH AVE · NEW YORK CITY ·
0 1 2 3 4 5 6
SCALE OF FEET

Fig. 2

Signal systems should be installed in conduits, just as a lighting installation is made. The 10-volt current is most readily obtained by passing the 110-volt lighting current through a "bell-ringing" transformer. There are several makes of these transformers for alternating current, and recently a trans-

former for direct current has been put on sale.

Operating Department. Movable operating room equipment varies and is often determined by the surgeons on the staff and the superintendent of nurses. Typical equipment for major and minor operating rooms is shown in the illustrations (Figs. 3, 4 and 5). To meet the requirements of the various surgeons a variety of equipment is necessary, and the selection should be left to the surgical staff.

Satisfactory equipment for a general major operating room is thus outlined: One instrument cabinet; one operating table; one stool for the surgeon and one for the anesthetist; one irrigator stand; one instrument stand; one solution basin stand, open ring at the top, cast base, mounted on casters; one anesthetist's set with ether apparatus and gas tanks, mounted on casters; one nurse's table, monel metal top, and shelf, size 20 x 48 inches, mounted on casters; one table, monel metal top and shelf, size 20 x 36 inches, mounted on casters; one drum stand, with two copper nickel-plated drums; one drum stand, with one copper nickel-plated drum, and one soiled dressing pail stand, cast base, open ring top, with steel porcelain pail.

The operating rooms should have lights providing for emergency light in the event of the failure of the electric current, such as the lights in the new Fifth Avenue Hospital operating rooms, these fixtures being fitted with eight electric bulbs and an auxiliary gas equipment, which affords a 300-c.p. gas light immediately, should the electric current be interrupted.

Equipment for a minor operating room may be made up in this way:

One operating table; one anesthetist's stool and one surgeon's stool; one anesthetist's set; one soiled dressing pail; one dressing table; one solution basin stand with a revolving top and with two solution basins, and one irrigator stand.

General operating rooms, intended to be used also by specialists, would have much the same equipment as the major operating room, excepting that the operating table should be selected to meet the particular needs of the eye, ear, nose and throat, the gynecology, the orthopedic and other specialists, but as the requirements as to equipment for the use of different specialists vary so widely, it is not possible to provide fully for them in a general operating room, and special rooms and equipment should be provided for special work if possible.

Cabinets. A considerable range of choice is possible in cabinets for various purposes in the equipment of a hospital. Varnished hardwood is the cheapest available material for cabinets and has the merit of standing hard usage for a long time without the necessity of refinishing. The appearance and characteristic construction of these cabinets would, however, restrict their use to duty rooms, diet kitchens and such other places as do not require strict asepsis or where appearance is not important.

Cabinets for dressings and instruments and the medicine cabinets at nurses' stations may be

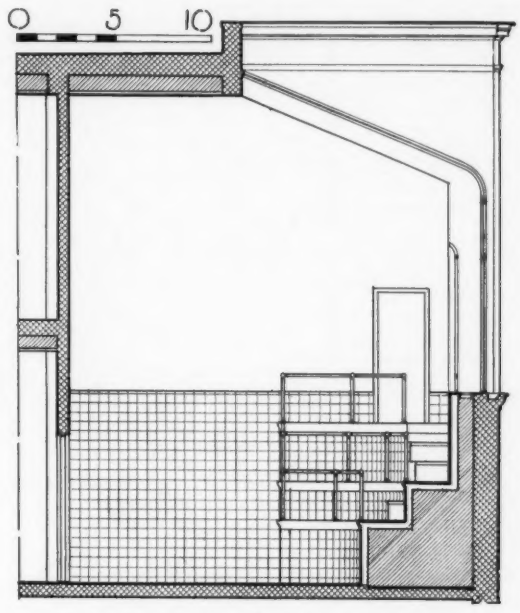


Fig. 3. Cross Section of Major Operating Room

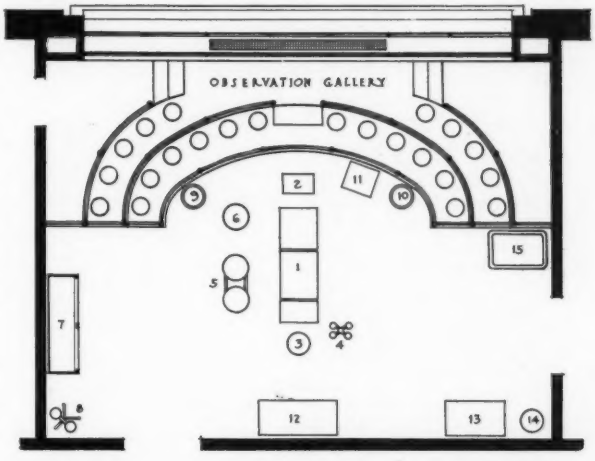


Fig. 4. Plan of Major Operating Room
Sloane Hospital for Women, New York
Crow, Lewis & Wick, Architects

enameled wood or enameled steel, preferably the latter, as the construction can then be lighter and of better appearance, and the cabinets can be more thoroughly sanitary. Heavy plate glass shelves, supported on adjustable nickel-plated brackets and having Carrara glass bottoms, improve the appearance of cabinets and are more easily cleaned than wood shelves.

Instrument cabinets in operating rooms should be enameled steel, with glass shelves and bottoms, and with drawers below for large instruments; they

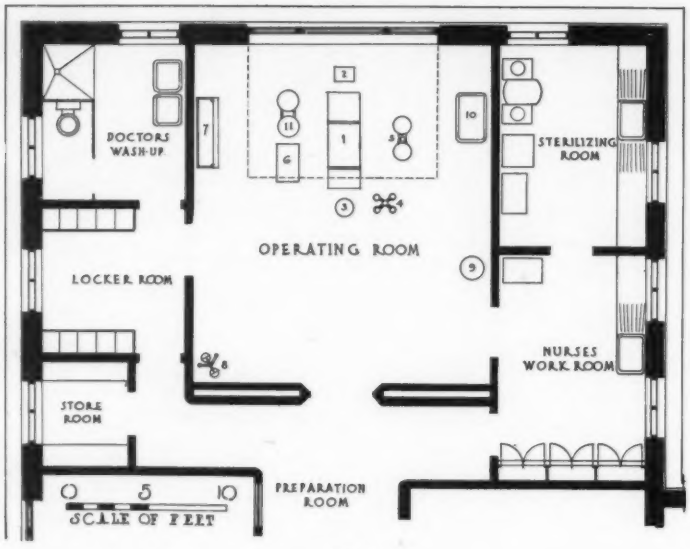


Fig. 5

1. Operating table
2. Surgeon's stool
3. Anesthetist's stool
4. Anesthetist's apparatus
5. Solution basin stand
6. Instrument stand
7. Instrument cabinet
8. Irrigation stand
9. Soiled dressings pail
10. Surgeon's sink
11. Drum stand

Plan of Minor Operating Room, Passaic General Hospital, Passaic, N. J.
Crow, Lewis & Wick, Architects

can be portable or built in with the fronts flush with the wall. Portable instrument cabinets have the advantage of being cheaper than built-in cabinets and of giving more latitude in the placing of the operating room equipment. Built-in cabinets undoubtedly contribute to the simplicity of the appearance of the operating room, but usually they involve a waste of space by reason of the thick partitions which must be built to contain the cabinets.

Blanket warmers should be placed at a convenient distance from any room occupied by patients, and very near each operating room. It is to be borne in mind that hot blankets are needed in emergencies, and that it should be possible to get them quickly. Portable enameled steel blanket warmers are made for steam, gas or electric heating. A steel-lined and insulated blanket closet can be built into the building when the plan will permit, and heated as described for the portable blanket warmers. If high pressure steam is available at all times, it affords the best method of heating the blanket warmers, if reduced to 35 to 40 pounds pressure, as it requires no attention of the nurses. Gas heating is less expensive than electric heating, but needs attention while the electrically-heated warmers do not, further than switching the current on or off.

Clothes Lockers. Private patients' clothes can best be kept in wardrobes in the rooms the patients occupy. A closet may be built in each room, but closets have the disadvantage of greater first cost than wardrobes and hamper the arrangement of furniture in a room, and the arrangement may have to be changed several times during the stay of a patient—at the request of the patient. Semi-private and ward patients' clothes can be kept in a locker in a room in each story, or a general locker room can be provided for the clothes of all these patients.

Having a receiving department, through which all ward patients must pass, is excellent practice. In this department the patient's street clothes are taken away, put through a disinfector and then placed in a locker in a nearby general locker room. The patient is bathed and dressed in hospital clothes before being taken beyond the receiving department. This is an excellent regimen as it minimizes the possibility of a new patient's carrying infection or vermin into the wards, which unfortunately has not been prevented under other forms of procedure. Lockers should be enameled steel with adequate ventilating openings. Lockers are made with mechanical ventilation for each group. In any case, the lockers should be placed in a dry and adequately heated and ventilated room.

Elevators. The necessity for safe and reliable elevator service is apparent in every hospital of over one story in height. In hospitals more than four stories high, or of more than 75-bed capacity, there should be at least two elevators to provide for emergencies requiring the moving of many patients quickly, and one elevator for use during breakdowns or repairs to other elevators. Elevators for passenger use are best grouped, to permit changing over in operation and to provide for a sudden heavy demand for elevator service.

The only type of elevator to be considered under the conditions usually encountered is the electrically-driven elevator. For motive power either direct current or polyphase alternating current affords satisfactory results. Where choice of both kinds of current can be made, the direct current elevator is preferable in view of the fact that direct current electrical apparatus is somewhat quieter in operation than apparatus operating on alternating current. Alternating current apparatus, however, does not fall short of the requirements of a hospital installation, for in the past few years notable improvements have been made in the use of this current, and satisfactory operation can now be obtained with it.

As it is essential that mechanical and electrical noises be minimized in every way possible, it is important that all precautions be taken to prevent the transmission of such noises as are always inherent to machinery in motion. The first step is to place the driving or hoisting machine at the basement or lowest floor of the building instead of locating it directly above the shaft, as is usual in other types of buildings. The machine should be placed on a sub-

stantial concrete foundation, and the foundation should be kept clear of all footings; in fact it is advantageous to surround the concrete block with sand instead of pouring the concrete flooring so that it connects thereto. The walls of the motor room should be, as far as possible, of such construction that they do not conduct sound. A sound-deadening partition with only a slot sufficient for the passage of the cables should be placed between the machine and the hatchway.

The minimum inside size of the elevator car to carry stretchers should be 5 feet wide by 7 feet deep, as this affords sufficient space for the stretcher and the attendant. As far as loading capacity is concerned, usually 2,000 pounds is sufficient and in fact generally in excess of actual requirements. However, in some localities there is prescribed a ratio between the car area and the loading capacity of the equipment, and where such laws exist they must be obeyed.

Car speeds can be proportioned to the length of travel. Usually 300 feet per minute may be considered the maximum speed that can be used profitably. For a five- or six-story building 200 feet per minute is sufficient. If a lower building is contemplated, speeds as low as 150 feet per minute or even 100 feet per minute are not impractical.

Two methods of car control are available. In most cases, especially where the elevators are separated or installed singly, the automatic type of elevator with push-button control is preferable as with this type of elevator any of the hospital attendants can call or dispatch the car. If it is desired to restrict the operation of the elevator to certain persons, key-operated push-buttons may be used at the landings, with keys placed in the hands of those whom it is desired to have operate the cars. Where elevators are operated continuously the standard manual control by means of a switch in the car should be provided. This type of operation is most desirable in tall buildings and where elevators are grouped together.

Recently a new device has been perfected for automatically bringing the car platform exactly on a level with the floor at a landing. This device is applicable to elevators of either push-button or switch control, and is particularly necessary in a hospital elevator where a landing an inch or so out of level causes discomfort to patients on stretchers or in wheel chairs. The leveling device has the merit of obviating "false flights"—jolting the car up and down at a floor in an effort to make a level landing, with the incidental waste of heavy starting current. The most suitable type of car is a plain paneled enameled steel car, with a practically entirely covered roof and with a plain thin band of stained and wax-finished hardwood at the height of the hubs of the stretcher wheels. This band takes most of the wear on the car and makes refinishing less often necessary.

Laundry Chutes. Soiled linen is customarily collected in canvas bags which are held in enameled iron bag holders until the bags are full and closed and then sent to the laundry. The bag holders are placed in the duty rooms. Infected linen requiring disinfection is handled separately and does not go into the laundry bags. While the bags can be taken down on the elevator, it is a great convenience to have a clothes chute into which the bags can be dropped to the basement, from where they are taken to the laundry. Under this practice no contamination of the clothes chute takes place, and there is no necessity of supplying special means of cleaning the chute.

The clothes chutes should be of light plate iron with all joints butted and all rivets countersunk so that the interior of the chute will be smooth and not have roughnesses to wear or tear the bags. The diameter of the chutes should be about 2 inches greater than the diameter of the filled bags. The chutes will vary from 18 to 26 inches in diameter.

At each story there will be required a door 30 inches high and the width of the diameter of the chute. These doors require angle-iron frames and the doors should be plate iron with spring hinges, latches and light checks to keep the doors from closing noisily. A plate iron collar should be provided from the frame of the door into the chute, the bottom sloping 45° to carry the bag into the vertical chute.

A certain amount of vacuum is created by the passage of the bags down the chute, and while the clearance around the bags, recommended before, will reduce the vacuum, it is advisable to take the further precaution of providing an air inlet, about 8 inches square, with a wire screen, in the top of the chute, and to proportion the thickness of the plates used in the construction of the chute and doors to the height of the building, a tall building requiring the use of heavier metal than a low building. Means for arresting the momentum of the falling bags is necessary at the bottom of the chute.

A considerable number of hospitals have installed a special clothes chute made of sections of cast iron, lined on the inside with a glass enamel and provided with a flushing device at the top of the chute and a drain at the bottom. These chutes have heavy circular doors. The use of sheet iron lined wooden chutes should be avoided.

Dumbwaiters. Where the dumbwaiter travel is not of more than two, or at most three, stories, and where the service is light, hand-operated dumbwaiters are practicable. These installations should have efficient brakes to hold the car at a landing, and the gearing should be practically noiseless. The size of the car should be about 2 feet by 3 feet and 4 feet high, with one hinged shelf. The car can be hardwood or steel.

Where the service is greater than that described for a hand-power lift, automatic electric dumbwaiters should be installed. These are practically miniature automatic elevators and operate similarly, excepting that the banks of operating buttons are placed outside of the shafts. Carrying capacity

of the dumbwaiter should be determined by the actual load to be carried.

Vacuum Cleaning Systems. As cleaning with soap and water is necessary in any event, a vacuum cleaning system in a hospital can be looked upon simply as a valuable adjunct for cleaning rugs, mattresses, upholstery and such other material as cannot be washed. A central plant, piped to from outlets throughout the building, gives the most perfect results, but at a considerable cost of installation. An alternative is to place receptacles for electrically-driven portable vacuum cleaners.

Sterilizing Equipment. Since the modern methods of sterilization are practically standardized and are accomplished more or less satisfactorily in the general type offered, the hospital's selection should be largely on the basis of utility and maintenance. It should be kept in mind that of all the equipment in the hospital, possibly without exception, the sterilizers are subject to most neglect and abuse. This abuse is not willful, of course, but, because of the constantly changing personnel and the lack of the mechanical experience needed, competent operation of these fixtures can hardly be expected.

A careful inspection of design, construction and materials usually reveals the merits of a sterilizer. There are more valves and fittings required for the operation of the sterilizers in an average hospital than for any other fixtures or groups of fixtures outside of the power plant. For the complete steam-heated sterilizer equipment of a medium capacity general hospital, say of about 100 beds, there are approximately 150 valves—all potential points of trouble—all subject to unusual performance, and entirely outside of the immediate supervision of the engineer's department.

The selection of the method of heating the sterilizers is naturally governed by local conditions and a consideration of economy. Medium pressure steam (of not less than 35, preferably 50 pounds at the fixture), electricity and gas have had practical demonstrations sufficient to be considered as standard methods. When steam pressure is available at all times, this provides the logical method, but if it is necessary to maintain a high pressure boiler plant especially for the operation of the sterilizers, it is frequently found that electricity or gas will be considerably more economical. A combination of steam and electricity or gas is sometimes desirable, especially for instrument sterilizers, providing for the use of the substitute when pressure is not available.

The electric method has many advantages over the gas, and can be used frequently to advantage in sections enjoying a low rate per kw. Unfortunately, however, heating by electricity involves a prejudice not altogether justified. It should be considered that the successful operation by either of the two methods involves, to a great extent, the human element. The same neglect that causes an electric heater to burn out will also cause even greater damage to a sterilizer heated by gas—burning dry. The cost of repairs is usually less in an electric fixture than in a gas-heated fixture, for the reason that the damage is localized, in the one case being confined to the replacement of a heater, whereas the damage caused to a gas-heated fixture may mean extensive repairs.

Typical sterilizing equipment required in an average 100-bed general hospital is thus planned:

General Sterilizing Room.
- 2 dressing sterilizers 16″ x 36″, with automatic control valves.
- 16 drums.
- 1 3-drum stand for each operating room.
- 1 pair of water sterilizers, 50-gallon capacity each tank, with automatic control valves and with 6-gallon capacity distilled water attachment.
- Instrument sterilizers, 9″ x 12″ x 22″ (one for each operating room).
- Utensil sterilizers, 20″ x 20″ x 24″, mechanical lift (one for each operating room).
- 1 saline solution sterilizer.
- 1 blanket warmer, 20″ x 24″ x 72″.

Maternity Department Sterilizing Room.
- 1 pair of water sterilizers, 10-gallon capacity each tank.
- 1 utensil sterilizer, 20″ x 20″ x 24″.

Dressings Rooms.
- 1 pair of water sterilizers, 6-gallon capacity each tank.
- 1 instrument sterilizer, electric, 5″ x 6″ x 16″.

Duty Rooms.
- 1 utensil sterilizer, 20″ x 20″ x 24″, mechanical lift (one for each ward).
- 1 instrument sterilizer, electric, 5″ x 6″ x 16″ } one for
- 1 blanket and bedpan warmer, 20″ x 24″ x 72″ } each ward.

Locker Room and Mattress Storage Room (convenient to both).
- 1 mattress and clothing sterilizer, 36″ in diameter by 88″ long, steam and formaldehyde—dry heat.

Incinerators. Disposal of waste may be made by burning it in local incinerators placed throughout the building, by burning the waste in one incinerator placed in a special room in the basement, or by disposing of all waste, including that from the kitchen, in one large incinerator outside of the building and preferably connected to a large chimney, such as the chimney of a power house, if this arrangement can be made. Local incinerators are not entirely free from objectionable features, such as a considerable consumption of fuel, the occasional escape of odors, and the need of repairs from time to time, especially if much wet waste is burned. The disposal of waste in one incinerator within the building overcomes some of the objections to the use of local incinerators, but if all the waste of an average sized hospital is to be disposed of in this one incinerator it is likely to be inconveniently large and there may be difficulty in providing an adequate flue for it.

General incinerators, outside of the building, can be built of masonry with firebrick linings and double grates, also of firebricks. In incinerators of this type practically no fuel is required, excepting for starting the operation of the incinerators, as the waste is dried on the upper grate and falls through to the lower grate, where it is consumed. The construction of these incinerators, being all masonry, is not destroyed by the distillates from the waste, even from very wet kitchen waste, and repairs are not often necessary. It is sometimes expedient to provide one moderate sized incinerator within the hospital in which to burn dressings, and to dispose of all other waste in the general destructor outside.

Hospital Finish and Decoration

By WM. B. STRATTON, F.A.I.A.
Stratton & Snyder, Architects, Detroit

HOSPITAL authorities are calling for the use of color. It will not do to wait the usual year for the appearance of "cracks" in walls. This item of color should get into the original contract, and in order to insure this the architect should specify and describe in general terms the colors for the interior of the hospital. It is not sufficient that he should specify "so many coats, applied according to the directions on the can."

British Military Nurse, Gibraltar

Hat and Dress, White; Cape, Warm Gray; Shoulder Cape, Red Broadcloth

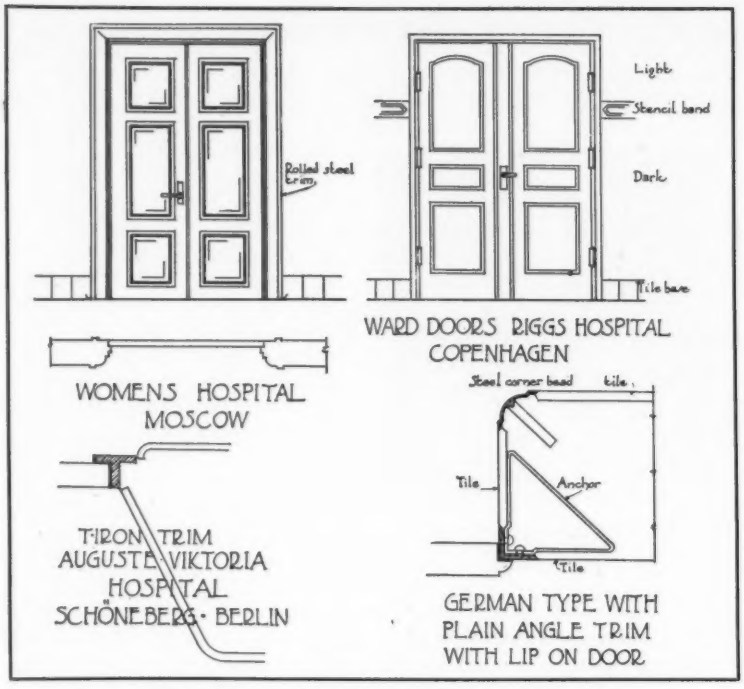
Color is a constantly active agent in the comfort of the patient. It adds to the welcome of the doctor and the nurse, and is ready at the first response of the patient to his surroundings to aid in a positive way towards recovery. It eases the shock of the transfer from home surroundings, and helps to eliminate fear from the mind. The architect should take every advantage of present knowledge in securing every possible interest for his color, and his specifications should be broad enough to call for richness in materials and variation in the manner of application.

The specifications should provide that the neutral shades should be reached through the use of strong colors and that there may be an opportunity to place contrasting colors in the different coats. After these items are securely placed in the specification and contract, the architect should use every means to get the most expert assistance to the end that at each point the utmost advantage may be taken of the natural lighting. Luckiesh gives five theories of vision. He winds up by saying, "Needless to say, however, there are those who entertain a different opinion on this last and other points." And so, while we are left in doubt as to the reasons for our feeling color, there is no doubt that we are greatly affected, for either bad or good, by the color in our surroundings, and that every means should be taken to see that these effects should be good.

The effective value of colors, given by N. A. Wells from extensive experiment, is thus summed up:

Exciting—from scarlet to yellow.
Tranquilizing—yellow-green to violet-blue.
Subduing—blue to purple.

Interior of Ward in Rigs Hospital, Copenhagen, Showing the Division into Alcoves by Screens

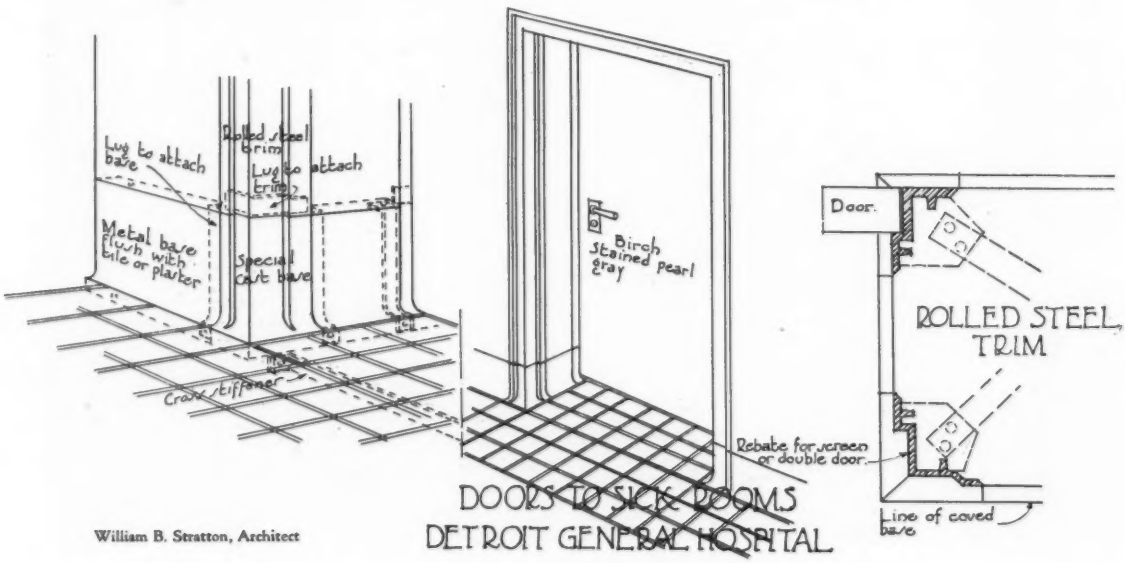


Details of Door and Corridor Finish in European Hospitals

Strong colors should be used in small areas, and tints and shades in large areas. The effective amount of color is determined by the solid angle subtended by the colored object, so that as our room walls come close to the eye, a comparatively small area equals the effect of the distant countryside and should be subdued accordingly. Color values should be used in combination, as they naturally appear at their most intense points in shading from white to black; that is, dark yellow should not be placed in combination with a light red to cite an example.

Besides the use of pigments, many restful effects can be obtained through the simple use of materials. Simple effects in woodwork and tile can be so handled as to be of restful influence. Points of interest in public rooms and halls call for moderate elaboration of decoration. The walls of corridors and points subject to much use or likely to be spattered should be of a different color or material, with limits plainly defined in order that the necessary cleaning may be limited to the portions affected. For this reason it is well to have an area of tile back of fixtures.

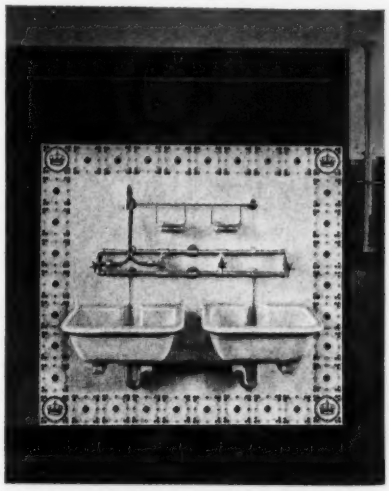
Simplicity and ease of cleaning are the essential points in hospital trim. The avoidance of mouldings and of angular features should be sought. There is a difference in regard to trim between the home and the hospital. In the home it is allowable to look for considerable architectural effect in the trim of doors and windows, while in the hospital simplicity should rule and the homelike effects be obtained by other methods. The various roundings of corners and angles so desired can be obtained by the use of metal or tile, but where economy demands it there seems to be no great objection to the use of plain band casings. Tile comes under consideration as a color vehicle, for desirable light reflection and for wearing qualities. In the operating room tile is valuable for conserving and concentrating the light admitted, and for this purpose the upper parts of


Lug to attach base
Rolled steel trim
Lug to attach trim
Metal base flush with tile or plaster
Special cast base
Cross stiffener
Birch Stained pearl gray
Door
ROLLED STEEL TRIM
Rebate for screen or double door
Line of coved base
DOORS TO SICK ROOMS DETROIT GENERAL HOSPITAL

William B. Stratton, Architect

the walls and ceilings should be light and highly glazed. The lower parts of the walls and the floors should be dull, the floors of a light neutral, and the wainscots of a darker grayish green to act as a relief from the eyestrain of the surgeon.

For general decoration in the waiting rooms, halls and wards, tile furnishes the most excellent permanent material, and responds most wonderfully to the skill of the designer. In fountains and other such adjuncts tile gives back the values of light in the most satisfying manner. For the rough, hard usage of the service portions, tile is the most permanent and satisfactory material. The report of the Flooring Committee of the American Hospital Association gives to the architect a most valuable suggestion of the manner of approaching the floor problem, and gives also a complete description of the qualities recommended for different purposes, even to giving the trade names. After determining the desirable points in relation to use, permanency and comfort, he can here find the result of experience in regard to materials thus far furnished. It would seem, in general, that heavy service requires use of tile or dust-proofed concrete, that thoroughfares should have a field of material of a soft type laid between coved bases of tile or terrazzo, and that floors of the rooms may be of any type that is easily cared for. The comfort of the patient and nurse comes before permanency.



Decorative Tile behind Lavatories in Rigs Hospital, Copenhagen

The door opening and rabbet should be of materials to conform to the general type of simplicity and permanency determined upon. To this may be added the requirement that they should hold their places while resisting the shock of the door. These qualities are perhaps best found in the rolled steel section. Perfectly satisfactory types are also made in heavy drawn metal. Efforts to use a wooden trim and get the same flush qualities between the wood and the plaster do not seem to have been successful, and where wood is used it is well to install a simple band casing. The door-leaf itself should be extremely simple. Where dampness is expected, doors may be of metal.

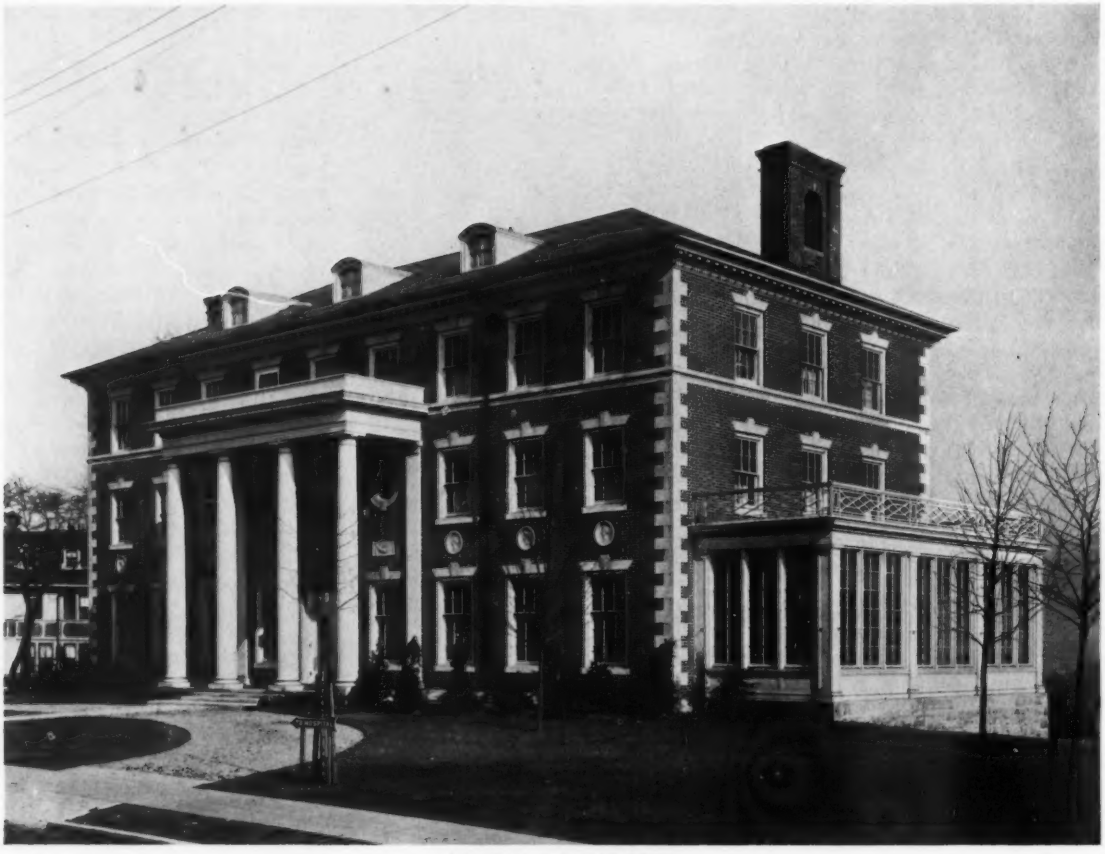
In thinking of the type of window it may be well to consider the most desirable features of a hospital. A. Saxon Snell, in speaking of the lessons taught by the war, places of first importance fresh air in abundance and the removal of foul emanations from the neighborhood of the sick. The Committee of Buildings, A. H. A., shows that the tendency is toward the use of the double-hung sash. There are many improvements in the double-hung sash, tending to give 100 per cent, well controlled ventilation and means of cleaning. In some types the sash screens slide entirely out of the opening, and in others the sash are pivoted and tipped in various ways. Many people, however, differ, and feel that the casement is the simplest and quickest means of getting the fullest ventilation and is the type most likely to be used regularly. The double casement with easily operated transom would seem to give every means for quick change of air, and while the most perfect circulation of conditioned air may be obtained through the use of modern apparatus, there still seems to be the need of periodic surrounding of the patient with fresh, sun-cured, outside air.

In regard to furnishing and decoration, there is a tendency to use cheerful hangings, rugs and furniture, and many items that tend to take the mind of the patient from his unfortunate condition.

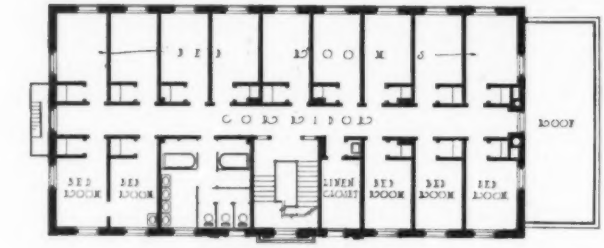
A Modern Private Room Treatment, Evanston Hospital
Richard E. Schmidt, Garden & Martin, Architects

Nurses' Home of Hackensack Hospital, Hackensack, N. J.

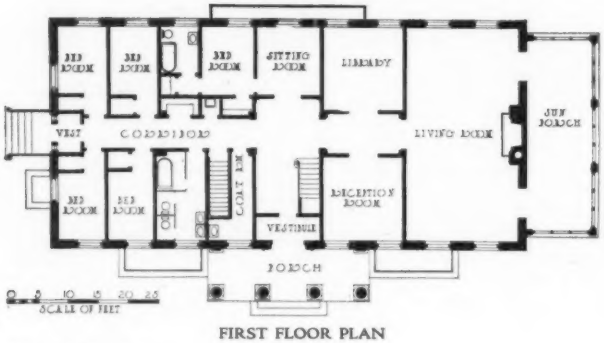
CROW, LEWIS & WICK, ARCHITECTS



GENERAL EXTERIOR VIEW



TYPICAL FLOOR PLAN



FIRST FLOOR PLAN

THIS illustration and floor plans are of the nurses' home of the recently completed Hackensack Hospital which is illustrated on Plate 96. Every possible provision has been made to give the home the atmosphere of a private dwelling, and with but a few exceptions the nurses are provided with individual rooms. Designed to agree in appearance and general character with the hospital building proper and of fireproof construction, the exterior walls of the nurses' home are of brick trimmed with limestone, and the roofs are of slate. Windows are of the double-hung type. Floors are generally of terrazzo and in certain of the rooms are covered with linoleum. Within this building are a small laundry for the use of the nurses, the kitchen for the nurses' home, a teaching diet kitchen, and the heating plant.

The cost of the building, which was built in 1916, was $125,000 without equipment, while the cubage is 150,000 cubic feet, or about 4,286 cubic feet for each of the 35 nurses whom the home accommodates, and the cost of the structure per cu. ft. was about 83 1-3 cents.

Prevention of Sound Travel in Hospitals

By CHARLES BUTLER, F.A.I.A.
Butler & Rodman, Architects, New York

THE problem of controlling and reducing noise in the hospital divides itself naturally into two parts: the reduction of the amount of noise generated, and the prevention of travel through the hospital of the noise which must exist. The former is a question of construction, while the latter problem may in general best be solved by careful planning.

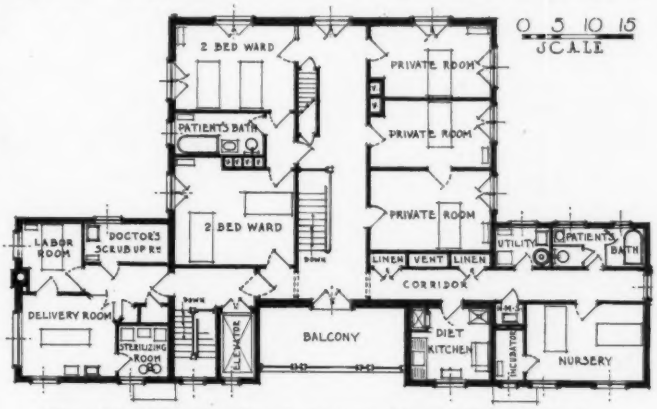
It must be admitted that all the tendencies of modern construction are toward the use of materials which are noisy; our patent plaster is harder than the old fashioned lime plaster, our materials for floors and partitions are harder than those used in the past, and with the complete elimination of curtains and other hangings the average hospital room has reached the acme of noisiness. This condition may, however, be much improved by the use of old fashioned lime mortar on walls and ceilings, by covering the floors with linoleum or cork or the rubber flooring now coming into use, by the use of curtains of washable materials, and in private rooms by the use of rugs.

What is known as acoustic felt deafening may be employed with advantage on ceilings and even on the upper parts of walls where they are not likely to be damaged. Its cost is by no means prohibitive, while its value in such rooms as nurseries, delivery rooms, kitchens and utility rooms can hardly be exaggerated. A similar treatment of corridor ceilings has proved most efficacious in toning down these long tunnels which reverberate with the inevitable noise caused by the passing of food trucks, the conversation of visitors and staff, and the hurry of feet. Excepting where the traffic is heaviest, corridor floors may also be covered with the soft type of floor finishes, cork, rubber or linoleum.

It seems needless to insist that no door in a hospital should be allowed to slam; this means that every door fitting into a rabbeted jamb must be provided with a door check. The snapping of the latch when the door closes may also be a source of considerable annoyance to a nervous patient, and this may be obviated by the use of a turn button to hold the latch back when desired, while rubber strips and bumpers set in the rabbets of doors may also be used to advantage. Doors to utility rooms and diet kitchens, which are constantly opened and shut, should be of the double-swinging type, and here it is well to spend the money required for the better type of floor pivot hinge.

Care should be taken in the details of elevator doors to prevent the jarring and noise caused by their being opened and shut. The two-speed, three-panel type of elevator door, so commonly used, is most satisfactory for hospital work in that it furnishes a relatively large opening, but it is exceedingly difficult to avoid noise in its operation. The use of the folding accordion type of door hung on ball-bearing pivoted hangers is well worth considering in this connection.

While the architect can, by the study of details and the use of suitable materials, greatly reduce the amount of sound transmitted, there are certain problems which can best be met by well considered arrangements of plan. It is evident that certain rooms in every hospital, such as kitchen, laundry, diet kitchens, utility rooms, delivery room and nursery, must from their very nature be sources of noise, and these should be as far as possible removed from wards and private rooms. In the case of the first two, this may best be accomplished by placing them on the first floor, in an extension or in a separate building, but in the case of serving pantries or diet kitchens and utility rooms, especially the latter, this is manifestly impossible. The utility room must be in close proximity to the ward, and then the only help lies in keeping the door always closed. The diet kitchen, on the other hand, may be placed a little farther away with nurses' room, day room or bathroom as a buffer between it and the ward. The problem of the location of these rooms is complicated by the tendency of the day toward increase in the number of so-called "quiet rooms" in connection with the ward units. These must be near to both utility rooms and nurses' offices and not far from the diet kitchens; needless to say, it is difficult to fulfill these requirements and still secure the quiet desired.



Plan of Remodeled Dwelling for Maternity Hospital Showing Distribution of Rooms to Control Noise. Butler & Rodman, Architects

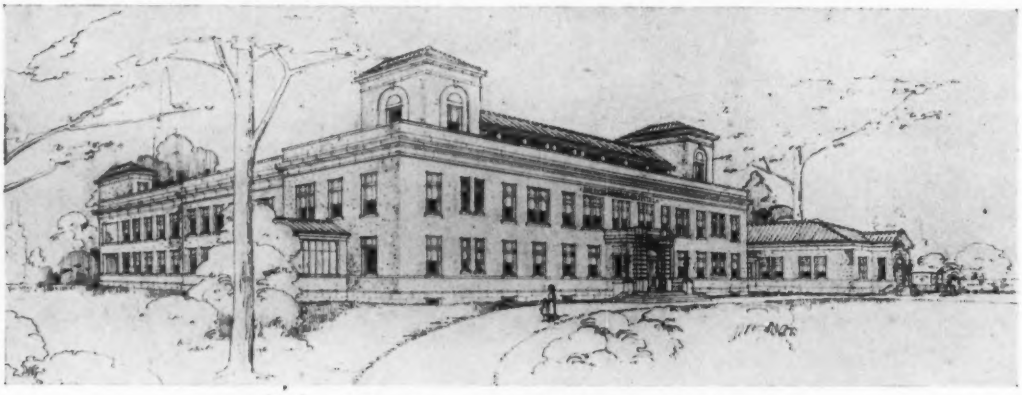
The location of delivery room, labor room and nursery in a maternity hospital is one requiring especially careful study. It would seem obvious that they should be well separated from patients' rooms, yet the writer saw recently the plans for a proposed maternity hospital where the delivery room was

directly across the hall from a row of private rooms. The most desirable arrangement appears to be that by which the delivery room with its sterilizing room and similar services is placed in a separate wing. If this is not possible, the section of corridor giving access to it should be cut off by doors, and only service rooms so placed as to have access to this section of corridor. The nursery should also be cut off from the patients' rooms, so that the crying of the babies will not disturb the mothers, and it may well be grouped with the delivery room.

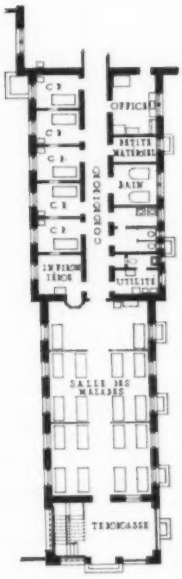
The writer had occasion recently to remodel a dwelling for use as the maternity department of a general hospital, and the plan of the upper floor of this building is given as an example of good distribution of rooms in this type of hospital, from the point of view of control of noise. It will be noted that one of the wings contains the delivery room, sterilizing room and labor room, and that the window of the labor room is on the side away from the patients' rooms, while the other wing contains the diet kitchen, utility room and nursery, the latter being on the side away from the patients. As the building in its original form contained all the space elements of final plan, the architect can claim only the credit of knowing a good thing when he saw it.

American Memorial Hospital, Reims, France

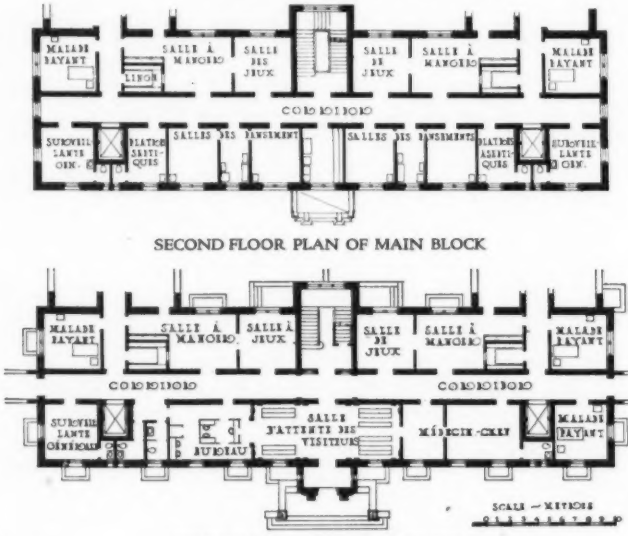
BUTLER & RODMAN AND AUGUSTE PELLECHET, ASSOCIATE ARCHITECTS



THIS building is a gift to Reims by the American Fund for French Wounded, and is to constitute the children's service department of the general hospital, although the plans permit its being operated temporarily as an individual unit. Construction is brick with stone base and cornices and stuccoed walls; floors, concrete. It has 110 beds.

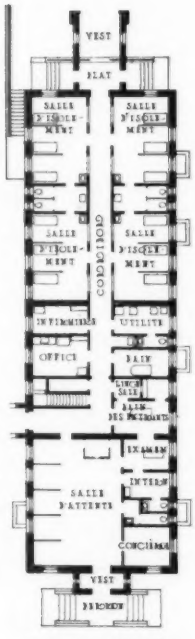


TYPICAL FLOOR PLAN OF WARD WINGS



SECOND FLOOR PLAN OF MAIN BLOCK

FIRST FLOOR PLAN OF MAIN BLOCK



FLOOR PLAN OF ADMITTING PAVILION

Hospital Heating and Ventilating

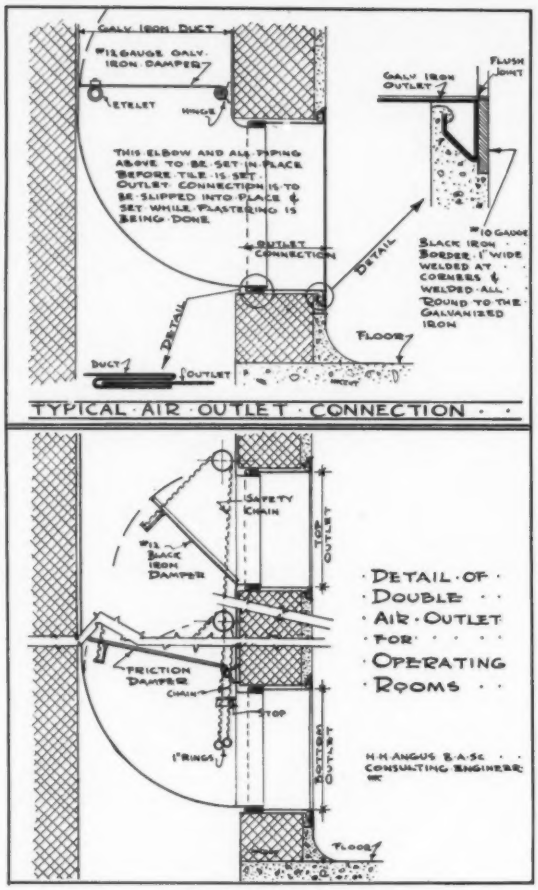
By HARRY H. ANGUS, B.A.Sc.
Consulting Engineer, Toronto. Member A.S.M.E. and A.H.V.E.

THE requirements for heating and steam in a hospital are similar in a general way to the requirements of other institutions, but they differ in that in a hospital high pressure steam is required every day in the year and 24 hours per day. This must be borne in mind in designing the power plant and steam layout, and there must be sufficient reserve so that in case of breakdown of any unit in the power house, the supply of steam and heat will not be shut off even temporarily from the hospital. The question of ventilation comes in mostly in connection with patients' rooms, kitchens and toilets, and is not of great importance for the nurses' home, help's quarters, etc., which are ventilated by opening the windows in the same way as the average residence.

There are many ways of installing heating and ventilating systems for hospitals, but they can all be divided into two general divisions, that is, systems in which the heating and ventilating systems are combined, and those in which they may be operated separately. In the former, heating and ventilating are accomplished generally by air taken from outside and heated and then forced into the rooms. This system is difficult to adjust as, generally speaking, all the air is heated in one place and is the same for all parts of the hospital, so that rooms which require the most heat must necessarily receive the most air and the greatest ventilation, even though the ventilation of these rooms may be of no importance. Also, when the wind changes direction, the amount of air going to the different rooms must be varied in order to give a uniform temperature to all rooms. This is difficult to do, and for this reason as well as because of the high cost of operating such systems, they are not favored for hospitals.

The second system is that in general use and involves the use of direct radiation in the rooms. The ventilation may be secured by drawing in the air from outside and purifying it, and then blowing it through a series of ducts to the various rooms, after being brought to room temperature by passing over coil heaters, or by placing an opening in an exterior wall or using a window and allowing fresh air to pass into the room unheated, or else by passing it over a radiator on the way in. In either of these cases it is necessary to remove the foul air from the room, and this may be done by gravity, an aspirating coil, or an exhaust fan. By installing temperature control on the radiators and an air washer and temperature and humidity control on the fresh air supply system, there is no doubt that uniform conditions may be obtained in the hospital. Where special cases are being treated, which require constant temperature and humidity, this system is most desirable. In general, however, medical men do not agree that constant temperature and humidity are necessary or desirable. In view of this, the natural, open window type of ventilation can be used. Of course where the outside air is filled with smoke or dust or other impurities, there is no doubt that the air should be washed and treated before being delivered to the rooms. This system is fairly expensive to install and operate and depends on fans and other mechanical appliances. Unless these are kept in running order and the operating engineer given strict orders regarding the running of the system, it will probably fall into disuse and the ducts become covered with dust inside. Like every other mechanical contrivance it requires intelligent operation for successful results. For general use, it will probably be found that the most convenient method of securing fresh air is to open the window or else place an opening at the back of the radiator leading outside. By using a draft strip or some method of preventing drafts it would appear that opening the window is the simplest and most sanitary means of getting air into the room.

The air from the room should be exhausted from a point near the floor and across the room from the entrance of the fresh air. This air is exhausted into a galvanized iron flue which is carried up to the attic or roof where it is connected with other ducts to form a trunk duct which is connected to the outside air. The opening into the room should be left without a grille and arranged so that it can be easily cleaned. An adjustable damper should be located in this exhaust flue which can be adjusted by the engineer in charge and yet be out of view of the patient. This damper may be adjusted to give the correct amount of exhaust ventilation for the room. Sometimes the vertical ducts are built up of tile, but it is difficult to get a tight job and galvanized iron ducts cost very little more, are much more sanitary, and save space on account of the thin walls as compared with tile. The amount of air exhausted from a room of course controls the amount of fresh air which will come in. The ducts may be so proportioned that in cold, clear weather there will be sufficient air exhausted from the building by gravity, but during mild weather of spring and fall, there must be either a fan or an aspirating coil placed in the main duct to produce sufficient flow of air. On account of the difficulty in getting operators to start and stop fans as required, it is usually better to depend on an aspirating coil which may be valved so that only a portion may be used at one time. These coils require practically no attention, and it is much easier to get the average attendant to use them than to start the fan at stated intervals. The fans could be wired so as to be started and stopped from a convenient point in the basement, but if this be done there is a tendency on the part of the operator to neglect the fans and motors.


GALV. IRON DUCT
#18 GAUGE GALV. IRON DAMPER
ETRELET
HINGE
THIS ELBOW AND ALL PIPING ABOVE TO BE SET IN PLACE BEFORE TILE IS SET. OUTLET CONNECTION IS TO BE SLIPPED INTO PLACE & SET WHILE PLASTERING IS BEING DONE.
OUTLET CONNECTION
DETAIL
GALV. IRON OUTLET
FLUSH JOINT
#10 GAUGE BLACK IRON BORDER 1" WIDE WELDED AT CORNERS & WELDED ALL ROUND TO THE GALVANIZED IRON
FLOOR
DUCT
DETAIL
OUTLET
TYPICAL AIR OUTLET CONNECTION
SAFETY CHAIN
#18 BLACK IRON DAMPER
TOP OUTLET
DETAIL OF DOUBLE AIR OUTLET FOR OPERATING ROOMS
FRICTION DAMPER CHAIN
STOP
1" RINGS
BOTTOM OUTLET
H.H. ANGUS B.A.Sc. CONSULTING ENGINEER etc
FLOOR

Details of Duct Outlets

Special ventilation is required for kitchens, laundry, laboratories and operating rooms. In these rooms it is advisable to connect the exhaust flues to fans and provide a by-pass around the fan for gravity ventilation. The operating and sterilizing rooms should have a fan for themselves, and this should have its control switch located on the operating floor in a convenient location. The fresh air for these rooms may be brought in by a fan and heater which will supply fresh warm air, or it may be brought in through the wall and over a radiator. In the operating rooms a glass screen is generally placed in front of the radiator, with openings to the room at top and bottom so that the patient is protected from drafts and the air inside the room circulates around the radiator. Vent outlets from operating rooms should have top and bottom openings into the room so that the air may be exhausted from the floor or ceiling. In the case of the kitchens, an exhaust fan and duct system only is required, as the fresh air will come from windows or the surrounding corridors. Diet kitchens and main kitchen may all be connected up to one duct system and one fan. By maintaining a slight vacuum in the kitchens, there is no danger of odors from this department spreading around the rest of the building.

The usual arrangement in kitchens is to place hoods over the equipment and exhaust all air from the rooms through them. A much neater and more sanitary arrangement consists in providing individual vents from the cooking apparatus. These are extended down to the floor and connected underneath to a main vent duct, the end of which exhausts to the atmosphere by gravity. The large amount of cooling surface of the main duct will condense most of the vapors, and the condensation can be drained off to the grease pit. The smoke connection from the range may also be carried down through the floor. The exhaust ducts may be from the walls of the room. This arrangement does away with all hoods over the apparatus, which are very difficult to keep clean.

Hospitals, like other buildings, are usually heated by direct radiators around the outside walls, and these may be supplied with either steam or hot water. If steam is used, it is advisable to use a two-pipe system with a modulating valve on the supply and a thermostatic trap on the return of every radiator. This does away with air valves such as are used on ordinary gravity systems. With the trap system, best results are secured by using hot water type radiators and supplying steam at the top. On large systems vacuum pumps are usually placed on the main returns to pull back the condensation, but on small buildings pumps are not necessary and air eliminators may be used. The trap system will give good results and is better than the one- or two-pipe gravity system. Automatic temperature control is very seldom used in hospital work as it is expensive to install, and doctors claim that absolutely uniform temperature for patients is not desirable. If hot water heating is used it should be a forced system. Slightly more radiation is required (about 10 per cent), but the pipes need not be larger than for steam, and the necessity for traps is removed so that from a cost standpoint there is but little difference between vacuum steam and forced hot water. Hot water seems to be better suited for hospital work than steam, as it is possible to vary the temperature of the water in the power house so that the rooms may be kept comfortable whether the outside temperature is high or low, without touching the radiator valves. Hot water also gives a uniform heat regardless of slight changes in the firing of the boilers. The radiators being not so hot as with steam, there is less danger from injury to patients. Hot water also works out more cheaply from an operating standpoint than steam. Bathrooms, operating rooms, crechès, nurses' stations and similar rooms should be kept considerably warmer than the patients' rooms. On the other hand, kitchens, laundries and sterilizing rooms require only sufficient heat to keep them at about 50° when the apparatus is not working. Radiators should be of the plain pattern hospital type, 3½ inches center to center of sections. It is advisable to keep them at least 2½ inches clear of the nearest walls. They should also be supported so that all parts are accessible for

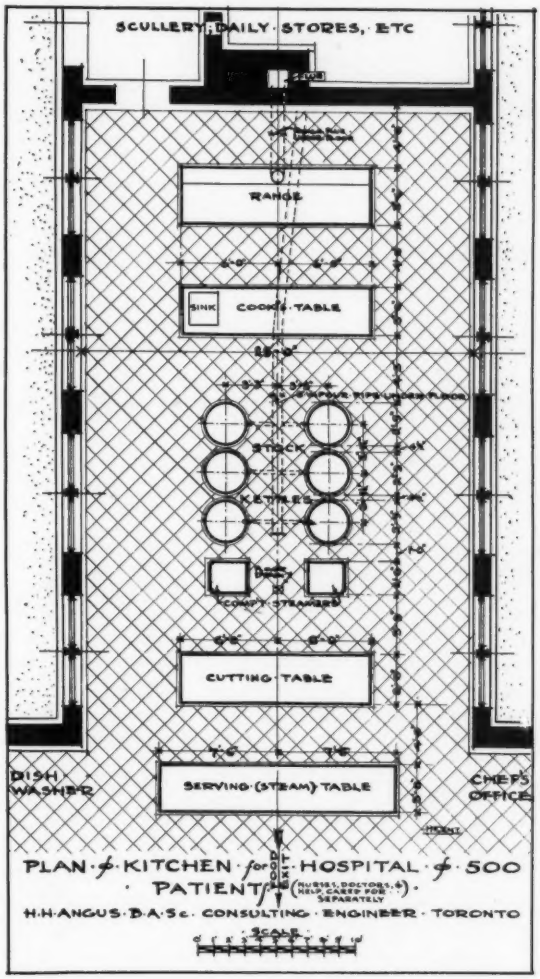
cleaning. This is often done by supporting the radiators on brackets from the walls. Where tile lining is used in walls, however, it is difficult to properly secure these brackets. To overcome this, the writer has used a center leg radiator which stands on the floor and a small brace is run from the radiator to the wall. The cut shows this radiator, which allows ample space for cleaning all around. Hospital radiators should have legs at least 6 inches high.

In addition to the general heating system, which should be arranged so that it may be shut off in sections for repairs, provision must be made for heating the operating rooms during periods when heat is shut off from the rest of the building. The radiators in these rooms are usually heated by steam and placed on a separate pipe circuit controlled from the boiler house. It is thus possible to secure heat in the operating suite on a cool day in summer, and at other times during the year the use of steam radiators allows these rooms to be heated up quickly. In these rooms there should be ample radiation. It is also advisable to use steam on the aspirating coils as these will be in most demand during spring and fall when the temperature of the water for the heating season would be comparatively low.

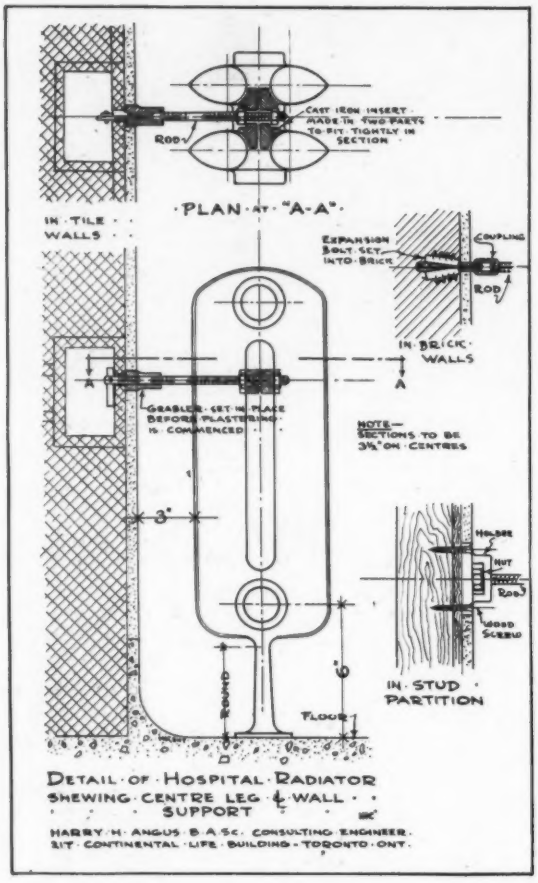
The location of the power house should be carefully chosen with the view of placing it as close as possible to that part of the hospital which requires the most heat. It should also be located so that coal and other supplies may be easily and cheaply delivered. There are of course many other matters which influence a correct location, and these should all be gone into carefully. Ample provision should be made for the extension of the power house and its equipment. Where the hospital consists of a number of scattered buildings, it is advisable to run tunnels underground from the power house to these buildings and to carry the pipes in these tunnels. If these tunnels are made large enough, the pipes are under view at all times and leaks can be repaired before they become serious. Where buildings are separated at considerable distances, the cost of tunnels is sometimes prohibitive, and in that case the pipes can be run in tile conduits of which there are several makes on the market. It must be remembered, however, that pipes which are run underground are hard to inspect and they may be in bad shape before leaks are found. The life of pipes in underground conduit depends to a great extent on soil conditions, and in some cases pipes will rust out in 4 or 5 years and in other cases they may last 20 years.

The hospital power house should be carefully laid out and equipped with the best machinery for economical generation of steam and power, as steam is required throughout the year and the use of efficient apparatus and layout will save a great deal in the cost of maintenance. In the small hospital, where hot water is used for heating, it may be pumped directly through the boilers, and in this case a separate steam boiler must be provided for sterilizing and laundry work. In the larger hospitals it is usually advisable to use high pressure water

Kitchen, Hospital for Insane, Whitby, Ont. (Plan Below)
James Govan, Architect



tube steam boilers fitted with mechanical stokers. These stokers should have considerable overload capacity, so that in case of sudden breakdown of any one boiler, the others may be able to carry the load, since the cutting down of this load may cause



considerable inconvenience. Generally speaking, it will pay the large hospital to generate its current by engine or turbine-driven generators and to use the exhaust steam for heating, either in converters to heat the hot water for heating or domestic purposes or to carry it directly to the radiators where these are to be used as steam radiators. There should be one spare boiler at all times so that the boilers may be alternately shut down and cleaned. The power house should be provided with plenty of accurate recording meters showing the pressures, temperatures and amounts of steam, water and coal used for different purposes. These records will provide a continuous check on the operation of the plant. They should also keep the efficiency at a high point in the boiler room and also check up the waste of steam or hot water throughout the institution. By connecting meters to the main branch lines and keeping accurate records, those in authority can soon tell when steam valves are left open or hot water wasted. It is necessary to provide steam for sterilizing, cooking, and laundry work, and in order to maintain a uniform pressure at the apparatus, it is advisable to carry a boiler pressure of at least 100 pounds and reduce this to pressures required. As laundry, kitchen and sterilizers are usually located in different buildings or in different parts of the main building, it is advisable to have a separate reducing valve and piping for each of these purposes so that the pressure may be adjusted to give the best results. Sterilizers should not have a pressure of over 50 pounds by gauge. Where electric power is generated in the hospital power plant, it is advisable to heat as much domestic hot water as possible in the power house so as to use up the exhaust steam from the engines, since during the summer months especially there would be no heating load and therefore no other use for the exhaust steam.

The cost of installation of a heating and ventilating system for a hospital varies greatly, depending on the climate, the type of ventilating system, the type of buildings and the grouping of buildings. A fair average of cost would be about 15 per cent of the total cost of the hospital on institutions of 100 beds or over. The cost of operation depends on the system installed, the climate and the engineer in charge. In a climate similar to that of New York, for a complete institution about 10 tons coal will be required per patient, and the total cost of maintenance and operation with coal at $6 per ton will be about $9,500 per annum for 100 patients.

This paper had dealt only with the general principles involved. The actual design of a system for any particular hospital is a matter requiring experience and technical knowledge. This work should in all cases be handled by a competent engineer who has specialized on heating and power plant work.

Serving Pantry in Addition to Evanston Hospital, Evanston, Ill.

Richard E. Schmidt, Garden & Martin, Architects

MASONIC SOLDIERS AND SAILORS MEMORIAL HOSPITAL, UTICA, N. Y.

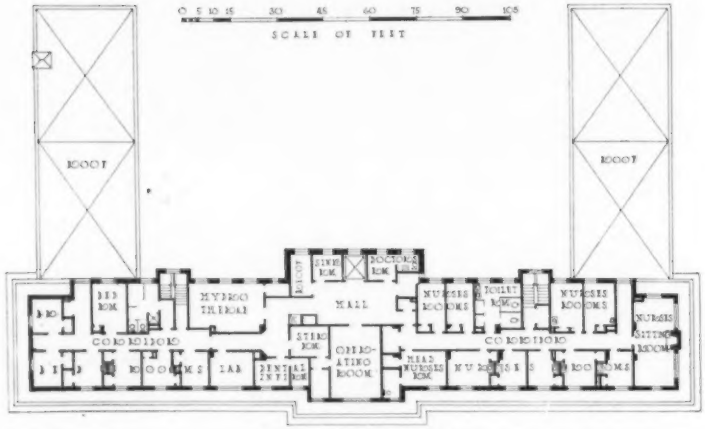
H. P KNOWLES, ARCHITECT

MASONIC SOLDIERS AND SAILORS MEMORIAL HOSPITAL
UTICA, N. Y.

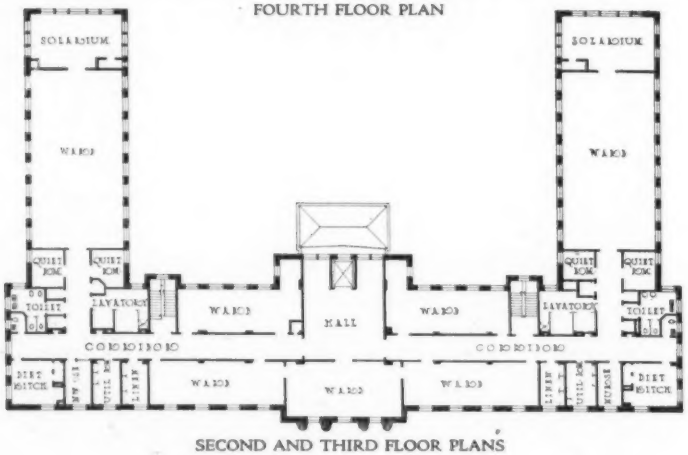
Illustrations on Plates 97 and 98

Type of construction. Fireproof
Exterior walls. Brick, limestone and terra cotta
Roofs. Slag and tile
Floors. Terrazzo and linoleum on reinforced concrete
Heating. Direct steam
Ventilation. Fans and ducts in toilets, utility rooms and diet kitchens
Windows. Double-hung with transoms
Area of building. 20,830 sq. ft.
Cubage of building. 1,020,765
Cost of building proper. $925,000
Cost per cu. ft. 90½¢
Number of beds. 240
Cubic ft. per patient. 4,253

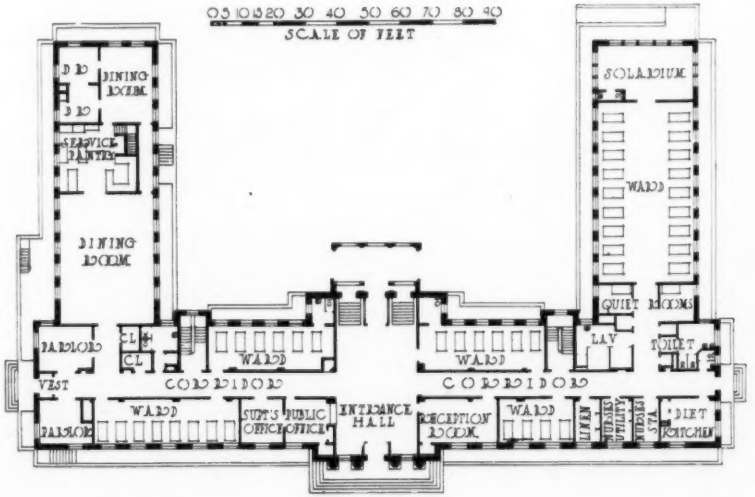
Operated in connection with Masonic home and intended for incurables and slow convalescents. Contract let at end of war at high cost level, and includes terraces and landscape work.



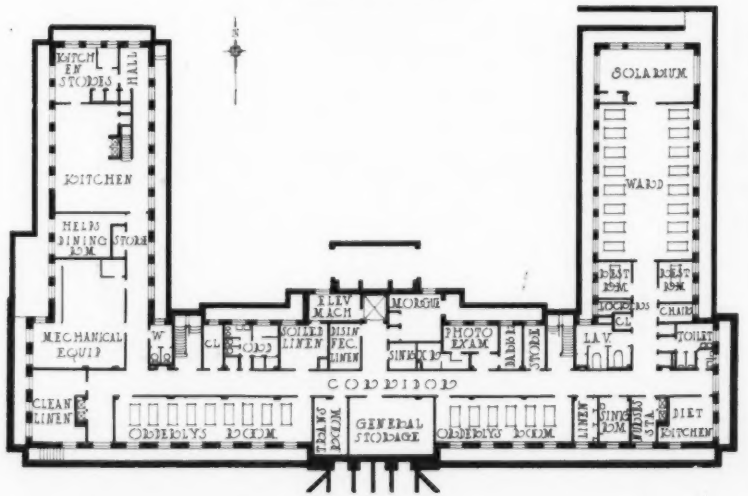
FOURTH FLOOR PLAN



SECOND AND THIRD FLOOR PLANS



FIRST FLOOR PLAN

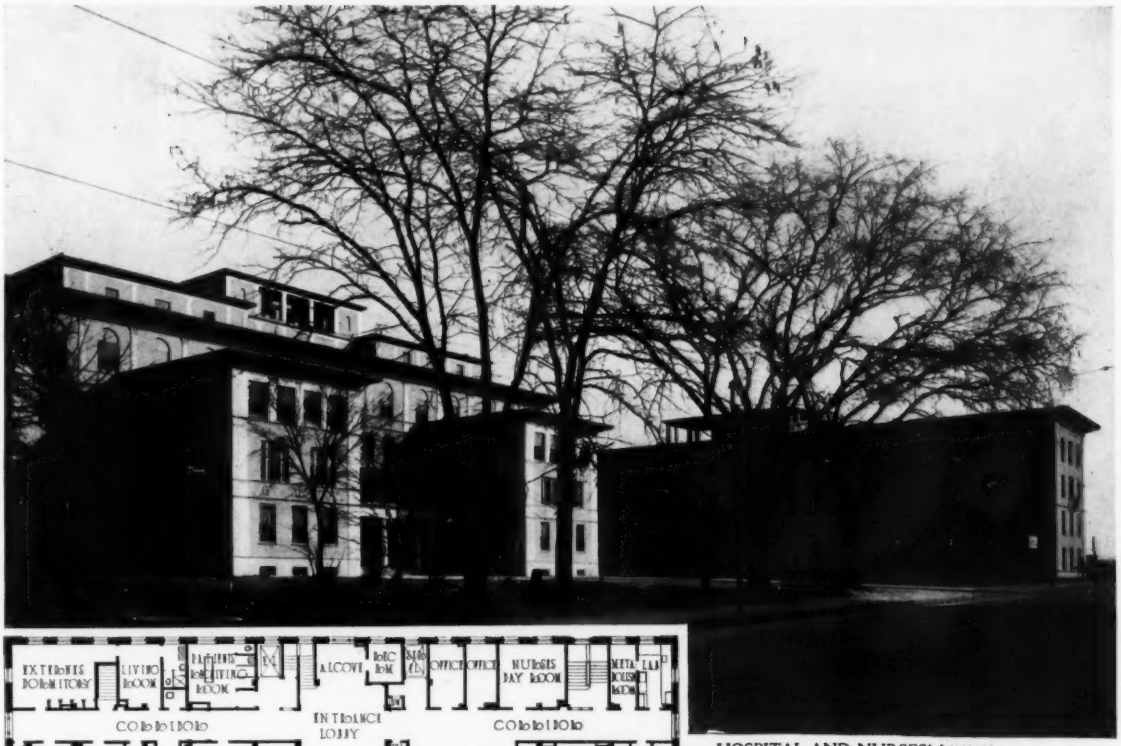


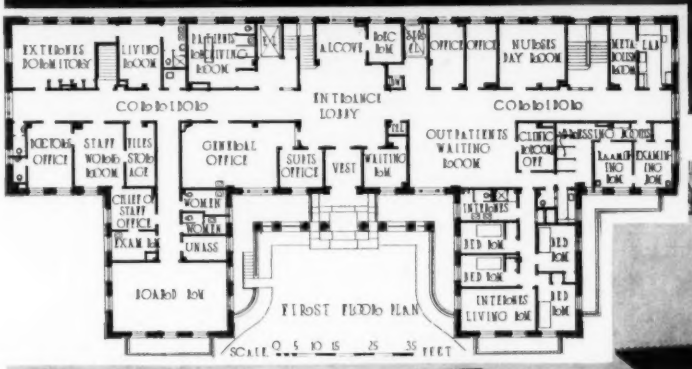
BASEMENT FLOOR PLAN

DETAIL OF ENTRANCE PAVILION

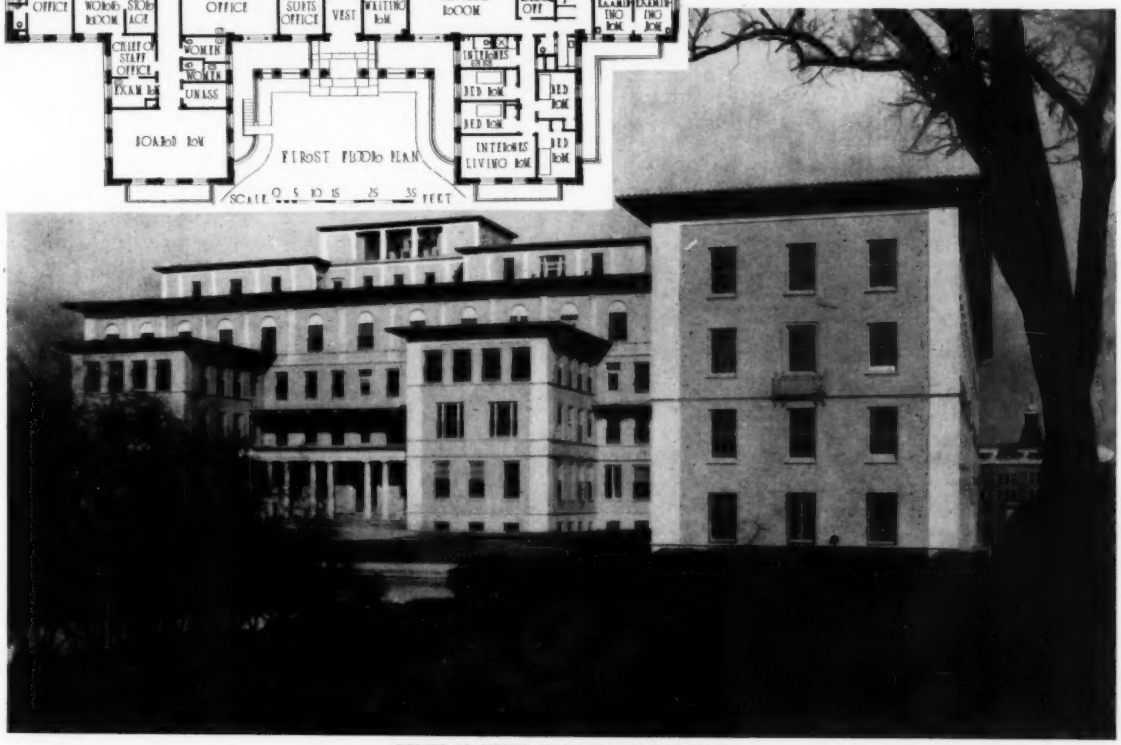
MASONIC SOLDIERS AND SAILORS MEMORIAL HOSPITAL. UTICA, N. Y.

H. P. KNOWLES, ARCHITECT





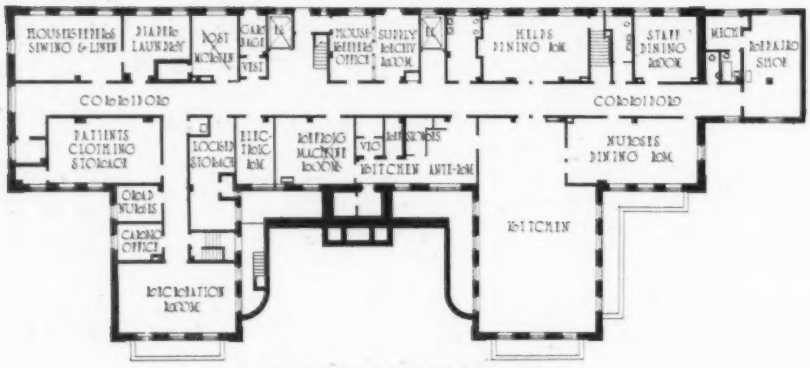
HOSPITAL AND NURSES' HOME



GENERAL VIEW OF ENTRANCE FRONT

BOSTON LYING-IN HOSPITAL, BOSTON

COOLIDGE & SHATTUCK, ARCHITECTS



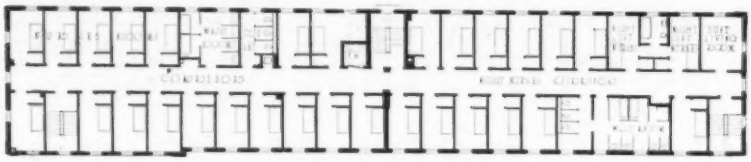
BASEMENT FLOOR PLAN OF HOSPITAL

BOSTON LYING-IN HOSPITAL
BOSTON

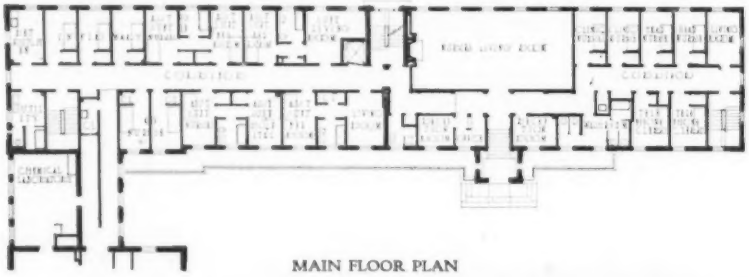
Illustrations on Plates 99 and 100

Type of construction. Fireproof
Exterior walls. Brick and cast concrete
Roofs. Tile, tar and gravel
Floors. Rubber and linoleum
Heating. Direct steam, thermostat control
Ventilation. Exhaust fans
Windows. Double-hung with ventilating sill boards
Area of building. 10,921 sq. ft.
Cubage of building. 765,268 cu. ft.
Date of general contract. June '21
Number of beds. 90
Cubic ft. per patient. 8,503

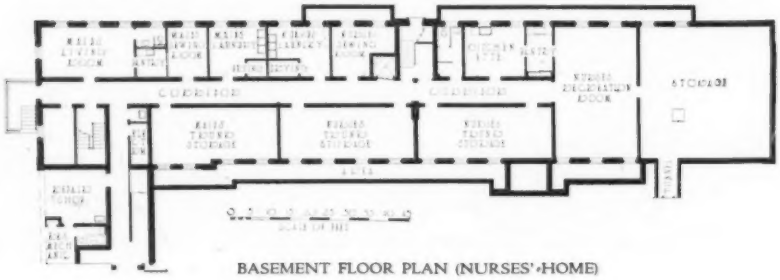
This construction includes kitchen; laundry and boiler room in other buildings. Third floor is similar to second, with exception of sick babies' nursery in place of premature nursery, equipped with wash room and room for wet nurses.



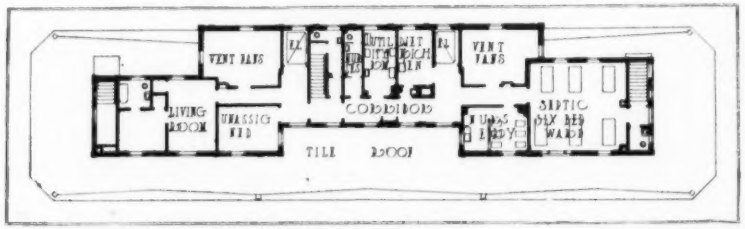
TYPICAL FLOOR PLAN



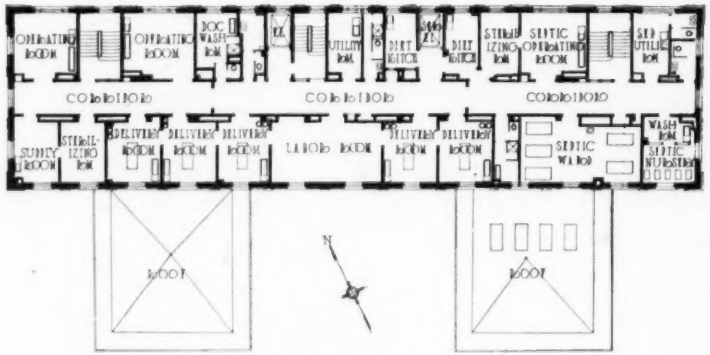
MAIN FLOOR PLAN



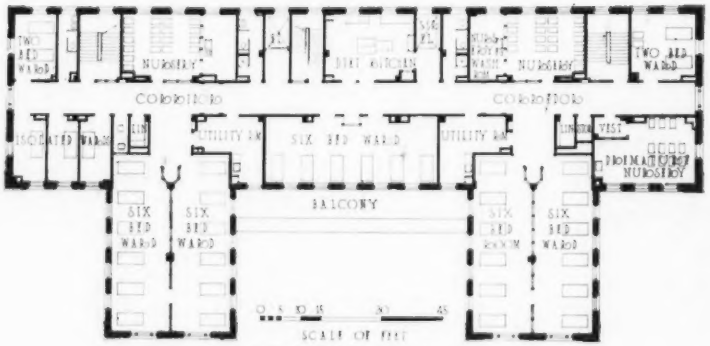
BASEMENT FLOOR PLAN (NURSES'-HOME)



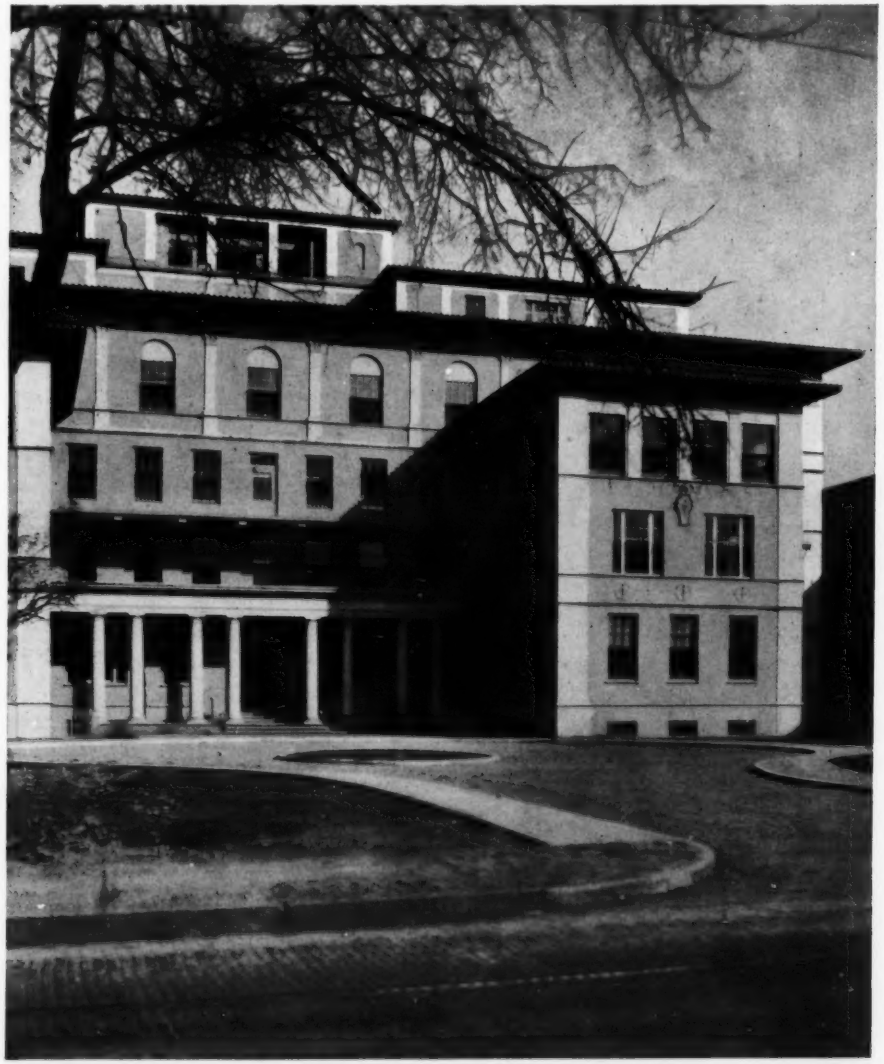
FIFTH FLOOR PLAN



FOURTH FLOOR PLAN



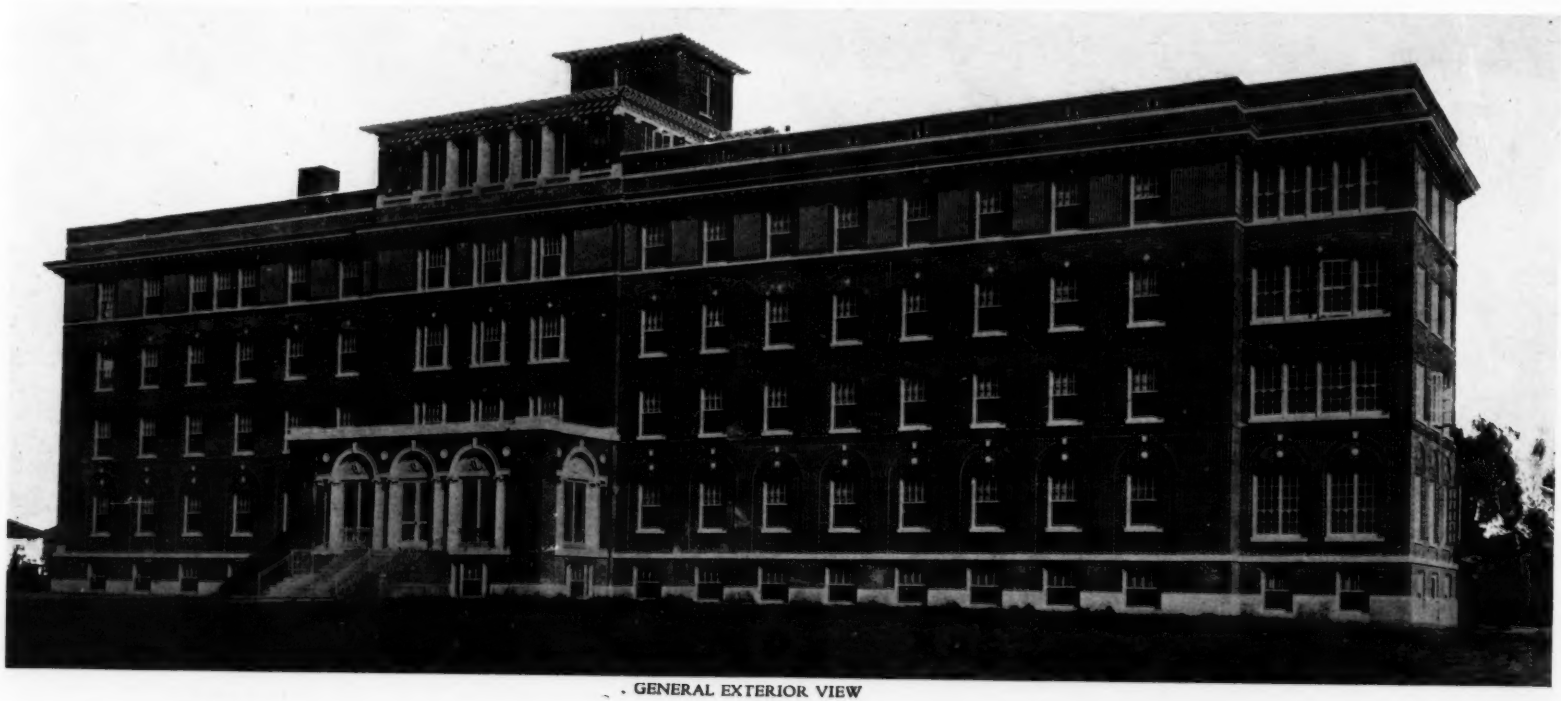
SECOND FLOOR PLAN



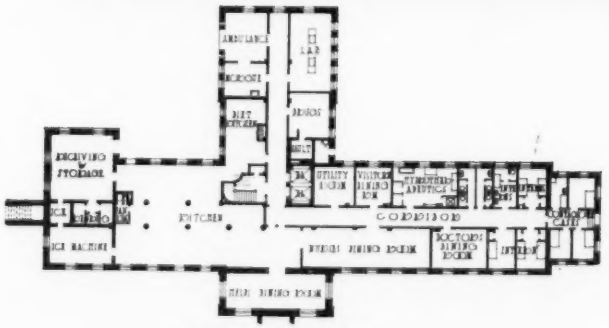
DETAIL OF ENTRANCE FRONT

BOSTON LYING-IN HOSPITAL, BOSTON

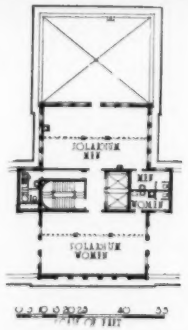
COOLIDGE & SHATTUCK, ARCHITECTS



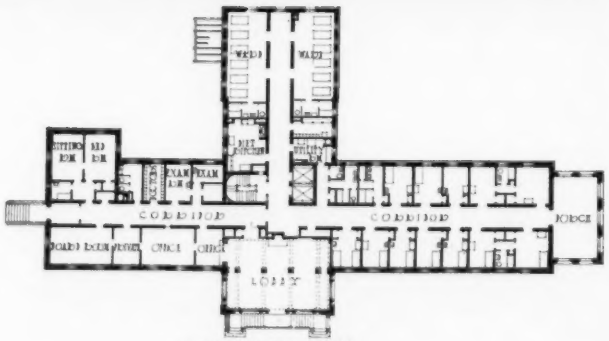
GENERAL EXTERIOR VIEW



BASEMENT FLOOR PLAN



ROOF SOLARIUM PLAN



FIRST FLOOR PLAN

WESLEY HOSPITAL, WICHITA, KAN.

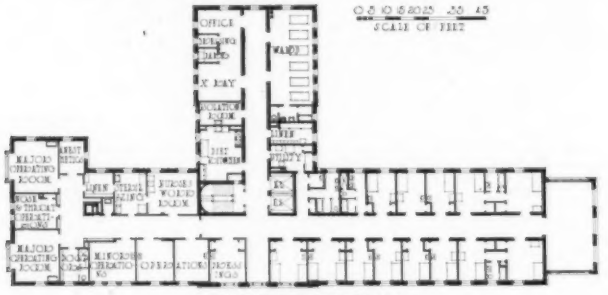
RICHARDS, McCARTY & BULFORD, ARCHITECTS

WESLEY HOSPITAL
WICHITA, KAN.

Illustrations on Plate 101

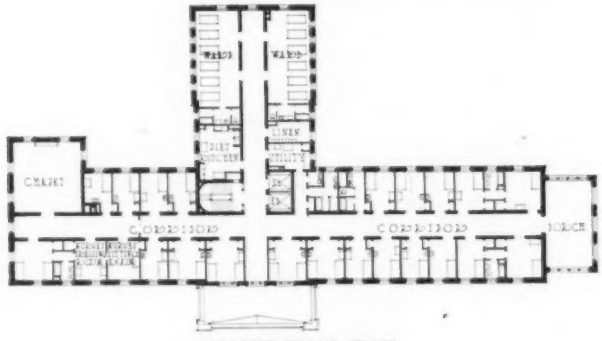
Type of construction. Fireproof
Exterior walls. Brick, terra cotta
Roofs. Composition
Floors. Cement, marble, terrazzo
Heating. Steam, vapor
Ventilation. Exhaust fans
Windows. Wood, double-hung
Area of building. 11,840 sq. ft.
Cubage of building. 774,500 cu. ft.
Date of general contract. March, 1918
Cost of building proper. $447,648
Cost per cu. ft. 61⅔¢
Number of beds. 120
Cubic ft. per patient. 6,454
Cost of operating per day per bed. $3.89

This construction includes kitchen. Laundry and boiler room provided in other buildings.



FOURTH FLOOR PLAN

THIRD FLOOR PLAN



SECOND FLOOR PLAN

Plumbing and Sanitation in Hospitals

MEYER J. STURM, A.I.A., *Architect, Chicago*

THERE is a well defined and established theory that plumbing is placed in buildings to secure safety for the public from unhealthy influences known to lurk in sewage and its gases. Therefore laws have been enacted for the purpose of protecting the public from such evils, but the very genesis of these laws defeats their end. Physics, bacteriology, pathology, sanitation and ventilation advance, and their theories and practices change so rapidly that ordinances relating to plumbing and sanitation are obsolete almost before their enactment. Most laws of this character are based on similar laws in existence where conditions may not be analogous to those locally encountered, ordinarily and frequently "colored" by politicians to meet the specifications of materials and appliances in the use of which they have a direct or indirect interest.

With these facts in mind it becomes incumbent upon the architects or engineers who are designing the plumbing and sanitation of hospitals, in which these trades are so highly specialized, to familiarize themselves with the minute requirements of such buildings and to consider the laws and ordinances as minimum only. It is not safe, expedient, or according to good practice to do otherwise. This necessarily entails, in such a highly specialized building as a hospital, the supposition that the architect or engineer knows all of the characteristics of every class of apparatus which would be attached to the plumbing or sewer lines. There is involved such a vast multitude of details necessary to attain the desired results that in an article of this character it might be well to consider this subject of "Plumbing and Sanitation" in group classes, and then to analyze these as far as possible under their group heads, such as Sewer Work; Plumbing; Plumbing Fixtures; Gas Fitting; Vacuum Cleaning Piping and Plant; Bath- and Toilet-room Furnishings.

In general, under the first three headings, would be included all of the water and sewer connections to fixtures for bathroom, toilet room, service room, kitchen, diet kitchen, laundry, hydrotherapeutic department and operating department, and the several allied special departments, and to such apparatus as refrigerating plant, etc. There can be no haphazard method of proportioning sizes, requirements or numbers of the several systems, nor of the fixtures and fittings necessary to provide these departments adequately with plumbing and drainage. All of the requirements for this work, and this must be particularly stressed, are matters of exact computation as to size and location, collectively and individually.

Sewers. Under this heading would be included all of the drainage system, or systems, as the case might be, including the house sewers, both soil and waste, all of the necessary vent stacks, branch fixture connections, sub-soil drainage, and the disposal of the rain water.

All pipes for this portion of the work, under all circumstances, inside the building especially, and so far as possible outside of the building within the premises, should be made of iron. In these days of highly specialized and standardized industries for the designing of sewerage systems it is hardly necessary to go into the methods and materials to be used. Almost any well arranged plumbing catalog will give these details. The traps, waste lines and vents of sinks into which acids or strong solutions are poured, such as are encountered in laboratories, should be made of ferro-silicon pipe. These should terminate in catch basins of the same material into which the waste of convenient fixtures may be run for the dilution of the contents before they enter the house sewer lines.

Unless main trunk sewers are very deep and the lines from the building connected to these have considerable fall, there should be back pressure valves placed on all lines where there is any danger of the sewage backing into the building. Floor drains and area drains of every character should be placed with exceeding care. Refrigerator waste lines should be made of sufficient sizes, and should terminate in small cast iron sinks and not be connected directly to the sewer. There should be clean-out fittings at the foot of all stacks, waste and soil, and clean-outs on all horizontal runs under ground, so located and spaced as to give easy rodding access.

Plumbing. To adequately describe in minute detail the plumbing required in a hospital would entail the writing of one of the most difficult and highly specialized specifications possible; therefore only a brief analysis can be given here. In all probability the most prolific source of increased cost in the maintenance of institutions is due not alone to inadequate plumbing installations, but to a lack of appreciation of the necessity of accessibility. There is always danger in the attaining of accessibility by the tyro to over-emphasize it to the extent of extravagance.

It might be well to summarize in this fashion: That the plumbing system includes the entire water supply, both hot and cold, from the house pump to the house tank and all portions between. This would include the filtered water supply, the distilled water supply and its apparatus, the heating of the water for the hot water supply, and the storage of this, the cold water supply and its storage, and the connection of these, not only to the so-called plumbing fixtures but to all of the equipment which is to be attached thereto, including the cooking apparatus, the laundry machinery and the sterilizers.

There should be valves and drains in the trunk

lines on both hot and cold water supplies. On all main branch lines there should be valves and drains, preferably at the foot of each and every set of risers in the building. In addition to these valves, without deviation, there should be a valve on each supply at every fixture throughout the building. Great care must be exercised in running the piping so that it is done in such a manner that the pipes will be accessible at all times. To accomplish this there must be provided adequate pipe shafts, chases and slots.

It is not good practice to run pipes horizontally in floors. If independent risers cannot be provided, then it would be far better to expose horizontal runs on the ceilings of the rooms below. This would entail no difficulties, inasmuch as in the standardization of floor plans for hospital purposes rooms having plumbing are ordinarily placed one above the other. Where there are only a few fixtures, such as in operating departments, it is advisable to beam or entirely suspend the ceiling below such floors rather than to run horizontal pipes in the floors. Where it is absolutely necessary to do this, such pipes should be run in continuous sleeves to allow for expansion and contraction, or if this is not possible they should be protected with galvanized iron both above and below, so that when the concrete is poured or the floor is finished the pipes will not be embedded tightly in the flooring material.

All waste lines from kitchens and diet kitchens should have grease traps. In most municipalities this is obligatory. Many institutions use the grease from these traps to make soft soap for their laundries.

The ordinary water system in the hospital need not be described here. The accompanying diagram (Fig. 1) shows a system which can be modified to meet requirements. Every hospital should be equipped with standpipes, connected either to an automatic pump or to a roof tank of sufficient capacity for fire protection. On each floor there should be a hose cabinet or cabinets, fully equipped in accordance with the Underwriters' Laboratory requirements. This not only protects against fire, but lowers insurance rates which in turn minimizes maintenance costs.

It rests largely with the architect in the designing of his building as to the method most expedient for heating the water. Whether this is to be accomplished by direct fuel consumption or whether by high pressure steam or by exhaust steam would depend largely on the general equipment. It is absolutely necessary that all hot water supply should be of the circulating type in order to facilitate the drawing of hot water immediately at any tap.

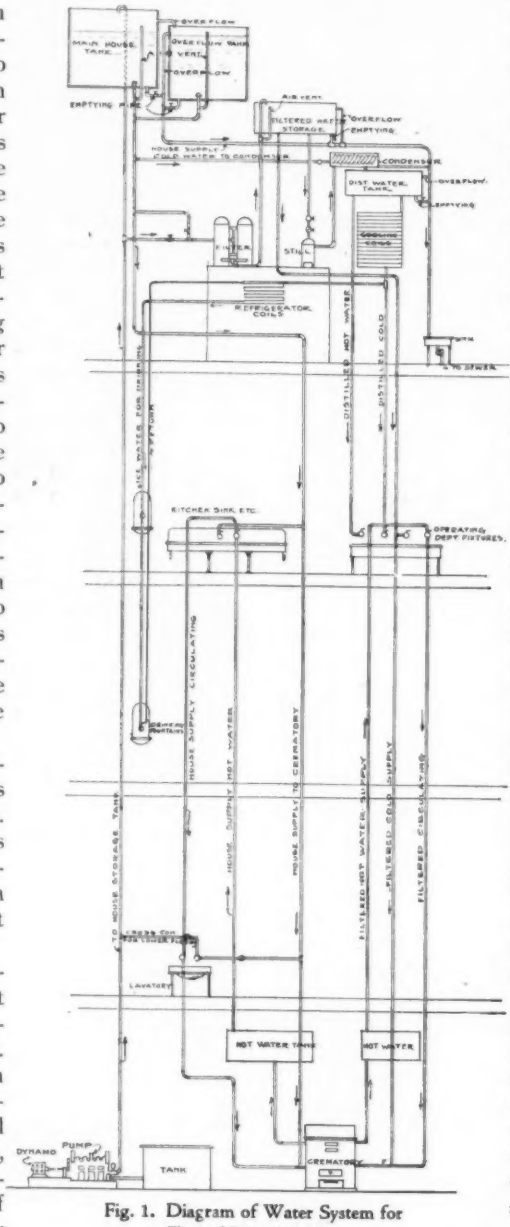


Fig. 1. Diagram of Water System for Typical Hospital Plant

One of the most difficult problems of hospital administration is dealing with the wearing off of nickel plating and the refinishing of plumbing trimmings. Polished brass requires too much attention and is subject to unsightly staining and corrosion. While this subject should be discussed under the head of "Plumbing Fixtures," it is so inseparable from continuous service and the element of lowered maintenance cost that it is well to mention it here. Any means of avoiding the discontinuance of water at any fixture, even for a short time, is to be highly recommended. All of those portions of the trimmings which come above the fixtures and which are frequently handled should be made of so-called "white metal." All those portions under the fixture may be made either of brass nickel plated, or of so-called rough brass painted. If the means are at hand to make an all white metal installation, it would be well to do so.

The sterile water supply in the operating rooms can be very readily taken care of under ordinary conditions where the sterilizing tanks are in an adjoining room, but where a number of departments are to be supplied with sterile water, such as several operating

rooms, delivery and surgical dressings rooms, the means for keeping this water sterile from the tanks to the faucets must be provided very carefully.

All pipes for conveying sterile water should be of white metal or iron pipe, block tin lined. At the sterilizers there should be placed shut-off valves, and into the sterile water lines there should be introduced a high pressure steam line so that all faucets from which sterile water is to be drawn can be opened and live steam run through. It is not safe to use so-called sterile water after it has been standing for any length of time, either in the pipes or in the sterilizers.

Plumbing Fixtures. It might be truthfully said, although it might sound trite, that "the best is none too good" when considering the selection of fixtures and fittings for hospitals, and here again there might be a dissertation in specification form.

As far as possible all plumbing fixtures should be kept away from walls, unless they have integral backs, and should be kept off the floors to the greatest possible extent. Wall hanging fixtures which have the proper support are much to be preferred to those having any connection with the floor. This is particularly true of lavatories, water closets and slop hoppers. Tubs should be built into the floor at their base and as far as possible be free on three sides so that patients can be readily handled. This need not necessarily apply to the bath tubs in nurses' or internes' quarters. The object of hanging fixtures in the manner described is not primarily one of sanitation but one of expedience in keeping the hospital clean with the least expenditure of time and labor.

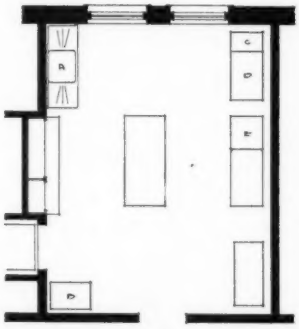
Ordinary bath- and toilet-room equipment, including the wash-up sinks and showers, need only to be mentioned. For the wash-up sinks and showers some special methods of handling the water should be provided. In the former some form of foot-, knee-, or elbow-operating valve is preferable. The foot-operated valve should be of the box type, flush with the floor. Both in this class of apparatus and in the showers there should be installed anti-scalding mixing valves, swinging or gooseneck spouts and rose spray connections.

All plumbing fixtures, especially those in hydrotherapeutic departments, operating departments, kitchens and service rooms, should be carefully selected and properly installed. Supplies to hoppers in service rooms should be operated by flush box foot valves, and all flushing valves should be similarly operated. Lavatories should have non-splashing rims and hooded, integral overflows.

The number of closets would largely depend upon the number of patients per floor, but under ordinary conditions one water closet in each such room will adequately take care of from 10 to 15 patients. One lavatory in each such room would also be sufficient. We are dealing with hospitals, and the majority of patients are bedridden; it is only those who are recovering and those who have long continued treatment and who are up and about, who use these bath- or toilet-rooms. A nurses' toilet, containing a closet and lavatory, should be provided on each floor. Such toilets are ordinarily placed in or near the nurses' stations.

There should also be a porters' sink on each floor in a separate space provided for the purpose. The room should be well ventilated. The supplies on the sink should be sufficiently high to permit the pails to be placed in the sink. Spouts should have pail hooks and supports. Wastes from these sinks should be at least 3-inch.

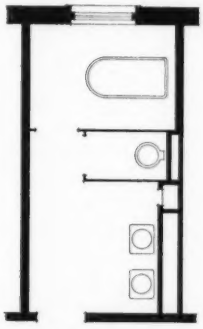
Under ordinary circumstances, in the moderate sized hospital, one service room on each floor would be sufficient if this one were properly equipped and located. The service room equipment varies somewhat in different institutions, but in general the function of this room is to take care of all of the so-called "dirty work" excepting the cleaning of floors, scrubbing and the like. Therefore, in this room there should be provided a slop hopper with a deep water seal. This fixture should have foot pedals for the operation of the flush and for the operating of the hot and cold water, so that the nurses may have both hands free to handle the bedpans. If there is no bedpan sterilizer provided in such a room, as there should be, then a swinging jet should be put in the hopper for the purpose of cleansing bedpans. The bedpan sterilizers are properly to be considered



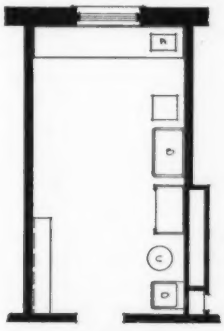
Diet Kitchen

A. Sink
B. Refrigerator—drain
C. Hot plate—gas
D. Steam table—water and waste
E. Dish washer—water and waste

Toilet and Bath



Private Toilet and Bath



Service Room

A. Hot plate—gas
B. Flower sink—water and waste
C. Bedpan sterilizer—water and sewer
D. Slop hopper—water and sewer

Plumbing Fixture Arrangements for Some Typical Hospital Rooms

as part of the plumbing equipment and must be connected to the soil system and have both hot and cold water supply.

Diet kitchens should be equipped with sinks with two drain boards. If these are of enameled iron the drain boards and back should be integral. If the sinks are made of vitreous ware they should have integral backs, and the drain boards should be made of ash with rim. If it is desired, one of these drain boards can be made with a telescopic leg so that the board can be folded against the wall.

Main kitchen departments should be provided with scullery sinks, dish-washing machines, glass and silver sinks, cooks' table sinks, vegetable, poultry and meat-washing sinks. These fixtures need not necessarily be in one room provided separate rooms are planned for the departments. The bakery would have sink as required. Where dish-washing sinks and dish-washers are installed, it is necessary to have floor drains properly connected.

Where there is provision made for special drinking water service the faucets for drawing this water may be placed on certain designated fixtures throughout the building, but it has been found more practical and somewhat more convenient to install drinking fountains for this special purpose. Where drinking fountains are used they should be of the recessed type, and the faucets should be high enough or so arranged that a pitcher used in drawing water can be conveniently placed under them. Whether a bubbler is necessary must be decided by the authorities of the individual hospital in which this service is installed.

Operating room sinks should be vitreous or semi-vitreous, and should be provided with both "tap" and sterile water. Such sinks should be sufficiently large to permit two persons to wash at the same time. Use of floor drains in operating rooms is optional with the hospital administrators. There seems to be an equally divided opinion as to their necessity or usefulness. Doctors' wash-up rooms should be provided with lavatories, showers and water closets, as required by the size of the institution, the number of operating rooms, etc. Sterilizing room equipment should consist of a deep sink with integral dished drain boards and backs. These can be procured in either enameled iron or porcelain.

The main laundry should be provided with necessary gutter and floor drains, laundry tubs and toilet rooms. The toilets should be equipped with showers and dressing rooms in addition to the fixtures ordinarily installed in such rooms.

In general, the quality, kind and finish of fixtures must be left to the choice of the individual architect, or to the board, or to both, but there are certain considerations in hospital work which are not encountered ordinarily in other classes of buildings. One of these is that the hospital must be used constantly. There is no opportunity for making extended repairs or to shut down any one department for any length of time without crippling the entire service. If there were unlimited means, one could provide for such a contingency by putting in duplicate, or at least more than a sufficient number of any one department or of fixture so as to adequately care for the needs of the institution. If, however, such an unnecessary procedure can be avoided by the simple expedient of installing the proper fixtures at the outset, it would be highly desirable that it be done.

In actual practice it has been found that all water closets should be if possible of the wall-hung type, equipped with flushing valves. Lavatories of the same material should also be of the wall-hung pattern. A good enameled iron tub will give practically endless wear, and now has an unlimited guarantee.

Scullery sinks should be made of metal. Such fixtures as slop sinks and ordinary sinks, including kitchen and diet kitchen sinks, if made of good enameled iron, will stand the test of wear and time. Unfortunately, large pieces cannot be made in vitreous china without being badly distorted. If it were not so this undoubtedly would be the ideal material for practically all of the plumbing fixtures in an institution.

Gas Fitting. It is particularly desirable that the gas fitting in institutions should be carefully laid out. First, there should be such exit lights as are required by ordinances. Secondly, irrespective of what character of apparatus is to be used in certain departments, gas should be supplied and the requirements ascertained previous to the installation so that these supplies will be adequately large. This would include the piping to laboratories, service rooms, diet kitchens and main kitchens.

Emergency lights and outlets should be placed in at least one position in each of the so-called operating and service departments of the institution and in a few selected locations in each corridor. A word as to these emergency lights will suffice. They should be placed without elaboration and with the utmost care to provide temporary light only.

Vacuum Cleaning and Plant. There has been some discussion as to the expediency of installing vacuum plants in small institutions, but there can be no question as to their desirability in the larger hospitals, and by this is meant those having from 75 to 100 beds and upward. The plant itself should be placed in such a manner as to preclude the possibility of causing noise, and it should be so attached to the system as to exclude this possibility. Great care must be exercised in proportioning both horizontal and vertical runs. All turns or changes in directions of the piping should be made with long turn recessed fittings. Risers should be so placed and outlets provided that it will not be necessary to use a hose over 50 or 75 feet in length. This will preclude the possibility of the hose and process becoming too cumbersome. It is not the function of this article to describe the different plants, excepting to make the statement that the electrically-driven machine is preferable.

Electrical Wiring and Equipment for Hospitals

By NELSON C. ROSS, *Associate Member, A.I.E.E.*

THE electrical equipment of the modern hospital will include general lighting service throughout offices, corridors, domestic and public sections; special lighting of patients' rooms, wards and operating rooms; electrical power for cooking and the operation of elevators, X-ray equipment, electrical sterilizers, mechanical refrigeration, laundry and other machinery, as well as low tension apparatus, including clocks, bells, telephones, nurses' calls and signaling systems.

The building being of first class construction, the wires of all systems will be run in conduits, these concealed, since in hospital practice it is of importance that all switches, panelboards, cabinets, etc., should be set flush with the walls, and that there should be no conduits or other exposed work to catch dust.

The hospital as a rule will include a boiler house apart from the main buildings, containing the boiler plant of the heating system, the refrigerating machinery and the hospital laundry. Further, in the event of an electrical generating plant's being considered, this also will be installed in the boiler house, and as it is separated from the main buildings the noise of the machinery will not be communicated to the hospital.

As the boiler plant is the center of distribution for the heating system, the boiler house should also be made the center of distribution for the electrical system, and the service switchboard should be located in the boiler house and under the direct charge of the engineer. In the event of a generating plant's being installed, the service switchboard becomes the feeder panels of the plant switchboard. If a plant is not installed, the street mains will connect directly to the service switchboard and distribute through switches to the feeder circuits supplying the hospital building or buildings.

Transformers may be located on poles in the street, or in pits in the street where underground service is supplied, and the secondary circuits from the transformers carried to the service switchboard. It is to be preferred, however, that a transformer vault be incorporated in the boiler house, so that the transformers will be accessible at any time for the replacement of fuses or for replacement or repair of the transformers. In designing the vault, a floor space with dimensions of approximately 12 x 8 should be allowed, with full headroom, and all doors and passages to the vault should be not less than 36 inches in width to permit the transformers to be removed and replaced if desired. The vault should be fireproof, and fitted with an underwriters' door with lock. The floor should be drained, a 6-inch cement curb provided at the door, and the vault should be vented to the outside air with not less than 60 square inches of duct. It is well to provide a cement curb or bed in the vault 6 inches in height on which to mount the transformers.

Primary mains should be carried into the vault through a tile or fiber duct, this being installed underground, and all primary cables being sheathed with lead. As a rule a three-phase power service requiring three No. 4 primary wires, and a single-phase lighting service requiring two No. 4 primary wires will be used, the primary service delivered at 2,300 volts. Secondary circuits for both lighting and power should be run from the transformers to the service switchboard in steel conduits.

The lighting service should be developed on a single-phase, three-wire system of wiring at 110-220 volts, the power service on a three-phase system at 220 volts. It is advisable to use a pressure of 220 volts for the power service, even though the customary power service in the locality be 550 volts, as hospital service requires a large number of small motors throughout the laundry, kitchens, laboratories, etc., and for use with portable equipment; these are as a rule operated more or less by women, and the use of a 550-volt power service introduces an element of danger that is not present when 220-volt service is in use. The switches and controlling equipment for small motors operating at 550 volts are larger and more expensive than like equipment for 220-volt service, and these are more difficult to install where the wall space is limited, and are at best unsightly.

With a service tunnel between the boiler house and the hospital, all feeder wires should be run in the tunnel, and should terminate in a distributing switchboard in a service room at some point on the basement floor; this switchboard should control both lighting and power risers, through fused switches.

The panelboards controlling branch circuits are located on the different floors and are so spaced that the average length of the branch circuits does not exceed 80 feet. Where possible the panels should be connected so that each floor has a separate riser circuit from the distributing switchboard; thus not more than one floor is without light in the event of a riser fuse's opening. Where possible, separate panelboards should be installed for the control of the lighting of the operating rooms, the lighting of these rooms to be controlled on two circuits (one-half of the lighting on each circuit), there being one riser from the distributing switchboard and an emergency riser from the service switchboard in the boiler house.

Electrical Cooking. Small electrical ranges, warming ovens and hot plates are taking the place of gas stoves for use in diet kitchens and treatment rooms, and provision should be made for their use. A riser may be carried from the distributing switchboard and may connect the outlets of the diet kitchens, with a similar riser for the outlets

of the treatment rooms, the outlets looping on the riser, and full sized copper connecting all outlets. The load at each outlet may be from 1,000 watts, where small hot plates are used, to as high as 5,000 or 6,000 watts with the use of small ranges; as a rule, the riser connecting three or four diet kitchens should not be smaller than three No. 4 wires. If desired, the outlets may consist of 30-ampere, 3-pole flush stage pocket receptacles, or permanent conduit connections may be made with the equipment.

Where electrical cooking is to be used in the main kitchens, and in the bakery as auxiliary to the coal or gas ranges, separate feeder circuits should be run from these outlets back to the service switchboard in the boiler house; if possible these circuits should be fed from the power service in order to obtain a "power rate." The ranges are designed for operation on a three-wire, 110-220-volt circuit, and if connected to one phase of the power service a balance coil should be used in order to give the proper voltage. The ranges and bake ovens will require from 8,000 to 20,000 watts (depending on the size of the ranges, etc.) when operating under full heat, and the feeder copper should be proportioned for the full load current.

Sterilizers. The larger sterilizers will be operated from high-pressure steam; provision, however, should be made in each operating room and in each treatment room for the use of electrical instrument sterilizers, wall receptacles of not less than 20-ampere capacity being used, permitting sterilizers of other portable equipment to be operated by being plugged into these receptacles.

Power Circuits. Separate power circuits will be run from the service switchboard to the refrigerating machinery and other motors in the boiler house. The modern laundry will be equipped with a master switchboard, generally furnished with the laundry equipment, from which all motors in the laundry will be mastered, a separate feeder running from this switchboard to the service switchboard. Separate power circuits will be run from the laundry switchboard to each of the motor-driven laundry machines, the conduits being concealed in the floor slab and turning up from the floor slab to the motors, making a waterproof installation.

The elevator machinery for a hospital building should be located when possible on the basement floor, in order to prevent vibration and noise being communicated to the building; the power circuit should be run from the distributing switchboard in the basement, and should be terminated at the location of the controller in readiness for final connection by the elevator contractor.

Where stationary X-ray apparatus is to be used, a separate feeder circuit should always be run from the distributing power panel for the control of this equipment, the copper sized for the full capacity of the equipment used. In addition to this a circuit of two No. 4 wires should be run from the distributing switchboard, this circuit looping to each corridor on the different floors, and a high capacity wall receptacle should be installed in the corridor so that portable bedside equipment may be used and operated from these receptacles. The receptacles may also be used for the operation of portable vacuum cleaning equipment.

Lighting Fixtures. Hospital lighting fixtures are finished in white enamel, and are of a plain design with full, smooth lines and without corners or projections that may serve to catch dust. Such fixtures in the rosette, ceiling collar and bracket form are made up in porcelain. Patients' rooms require either ceiling fixtures or wall brackets over the beds; in many cases both are used, there being one ceiling pendant controlled by a switch at the door, the brackets being controlled from chain sockets. If it is desired that the patient may not use the light without the consent of the nurse, a switch may also be installed to control the brackets. As a wall receptacle is installed at each of the beds, this also permits the use of a portable fixture at the bed if desired.

The wards will require both pendant ceiling fixtures for general illumination and brackets at the beds. The ceiling fixtures should in all cases be double-circuited and should be fitted with lamps of low wattage for "all night use" as well as with one or more large lamps for general illumination of the room, both circuits being controlled from switches at the entrance door.

There are many different types of lighting fixtures available for operating rooms, the requirements being a strong light projected on the operating table, the lamps being enclosed in diffusing glass to prevent glare, and so placed in the fixture that there will be no shadow on the patient when the surgeon is operating. This is sometimes accomplished by placing the outlet over the table and mounting the lamps on a large ring, each lamp being focused on the table, or by placing the lamps and reflectors behind some type of prism glass. The writer has found it good practice to use four outlets over an operating table, these set approximately 6 or 8 feet apart and over the corners of the table, a pendant fixture fitted with high wattage lamps and diffusing glass being installed at each outlet. It is of importance that the fixtures in operating rooms be connected on two circuits, and if possible fed from two sources of supply, so that all light will not be cut off in the event of a fuse's opening on the circuits; it is also advisable that separate circuits be run to each of the operating rooms from the panelboards. In addition to the ceiling fixtures there should be portable floor stands provided for use in each operating room, these arranged to be plugged into any of the wall receptacles.

The fixtures throughout the treatment rooms, diet kitchens, utility rooms, main kitchens, etc., are of the collar type and are installed close to the ceiling and fitted with some type of opal glass that may be easily cleaned. In addition to the ceiling lighting, receptacles and lamps should be located

under the range hoods, so that these lamps will give direct light on the ranges and kettles.

Low Tension Equipment

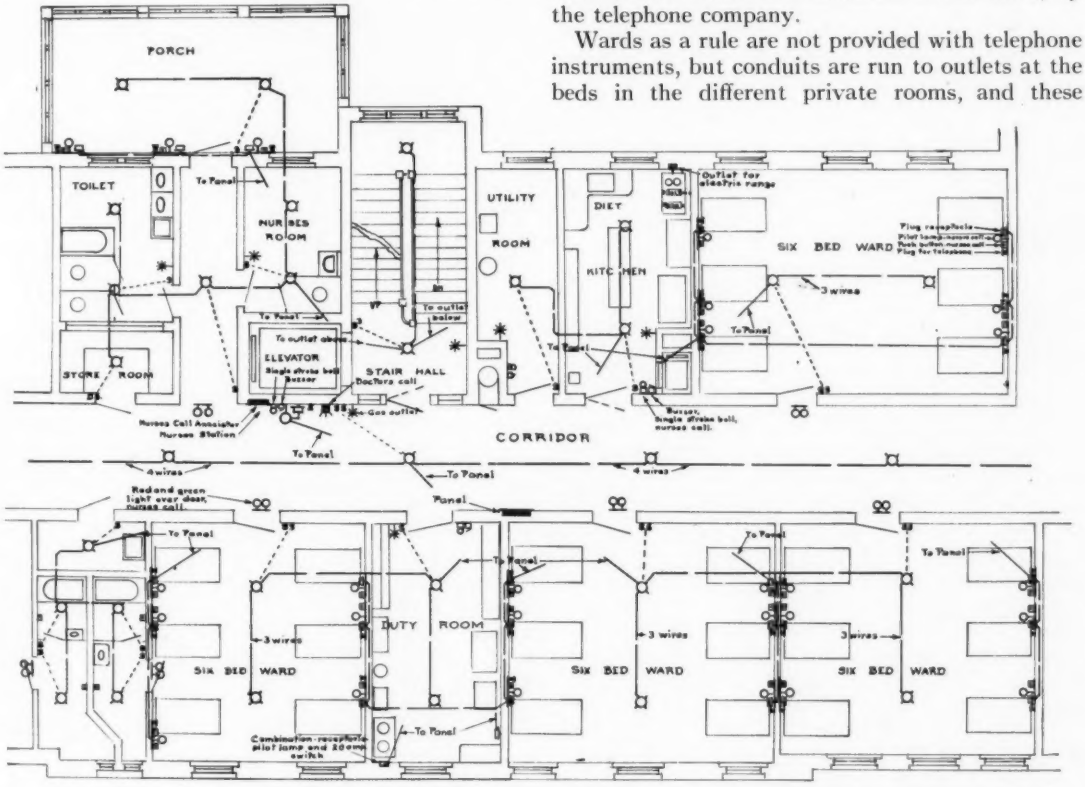
Nurses' Call System. Each floor where there are wards and patients' rooms should be fitted with a separate "nurses' call" or signal system by which the patients may call the nurses when desired. Broadly, the system consists of an annunciator at the nurses' station in the corridor, with patient's button at each bed; a canceling button is also placed at the bed, together with an emergency call-button, pilot lamp, telephone jack and lighting receptacle. Over each door from the corridor there are placed a red lamp and a green emergency lamp.

In the operation of the system, the patient calls the nurse by pressing the patient's button; the red lamp over the door lights, and the annunciator lamp corresponding to the number of the station also lights, both remaining lighted until the nurse cancels the line at the bed. The nurse does not cancel the line until ready to leave the patient, so that the lighted lamps on the annunciator and over the door indicate where the nurse may be found. If upon visiting the patient the nurse requires help, she presses the emergency button which lights the green lamp over the door, and anyone seeing the green lamp lighted immediately goes to the assistance of the nurse. In addition to all this, a signal lamp and bell signal are located in each diet kitchen, treatment room and utility room, and these are connected with all the bed signals, and indicate to any nurse in these rooms that a patient has called.

If a permanent record is required, a time recorder may be located in the office of the superintendent or elsewhere. This is an instrument that indicates on a chart the time that each call is made and the time that it is answered and canceled. The system on each floor should be separate from the others, and each should be controlled from the annunciator at the nurses' station. In two-bed wards or in private rooms the pilot lamps at the beds may be omitted; in large wards, however, these pilot lamps should be used, as the light at the bed indicates to the nurse entering the ward the location of the patient who has made the call.

The Telephone System. While private telephone systems are used at times in the smaller buildings, hospital practice requires that the public telephone service be available at nearly all points, and the buildings are usually fitted with public branch telephone exchanges, the switchboards being located in the general offices and at all times under the charge of operators. The wiring contract should provide for a complete raceway of empty conduits from the telephone switchboard to the different telephone instruments, the raceway being left in readiness for the later installation of the wires, by the telephone company.

Wards as a rule are not provided with telephone instruments, but conduits are run to outlets at the beds in the different private rooms, and these



Typical Hospital Floor Plan, Showing Arrangement of Outlets for Lights, Plug Receptacles, Telephones, Doctors' Call and Nurses' Call Systems

outlets are fitted with jack receptacles. When a patient is permitted to have a telephone, the cord is plugged into the jack. It is not always possible, in laying out the work, to determine the rooms or groups of rooms that should be supplied with telephone service; the empty conduits to the rooms, however, are not of great expense.

With many instruments closely grouped on each floor, connecting cabinets may be located in the corridors and connected with the switchboard through cables in a single conduit, all runouts from these cabinets to the individual outlets being made with twisted pair, telephone conductors. Where the outlets are scattered it is well to consider twisted pairs from the main connecting cabinet to the instrument.

The telephone outlets should be the standard outlet boxes as used for the lighting service, these fitted with switch covers permitting the boxes to be covered with blank switch plates when not in use. For wall instruments the outlet boxes are set 60 inches above the floor, the instruments covering the boxes. For desk instruments the boxes are set at the baseboards. At the patients' beds the boxes are set in line with the outlets of the nurses' call system, and are covered with one gang plate. In sizing conduits for twisted pairs not more than two pairs should be run in a ½-inch conduit, four pairs in a ¾-inch conduit, and six in a 1-inch conduit.

The Doctors' Call System. Some provision must be made so that the telephone operator may get in immediate touch with any of the doctors present in the building. To do this by use of different telephones would prove confusing and would require considerable time. A call system is therefore installed, with a calling station at the telephone switchboard and receiving stations located throughout the corridors on the different floors, the receiving stations being not more than 75 feet apart. The receiving stations may consist of lamps behind numbered glass, each number indicating the person desired, or they may consist of bells or buzzers, on which a code signal is rung, or else they may consist of loud speaking telephones which transmit the voice of the telephone operator, announcing that a certain doctor is wanted at the nearest telephone.

The Ambulance Call. If an ambulance is used at the hospital, a gong should be located at the ambulance station, with a push-button at the telephone switchboard so that a signal may be given by the operator when the ambulance is required.

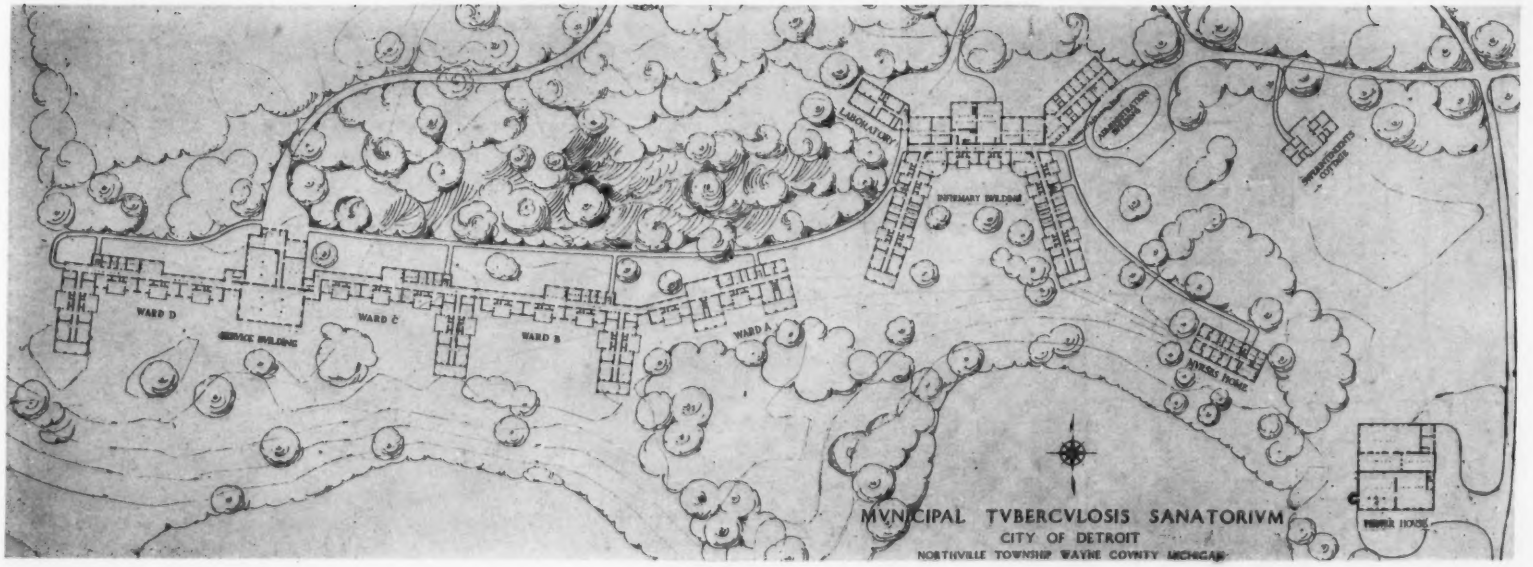
Bells and Annunciators. The office sections of the hospital may require bell and signal systems between offices, or between offices and desks. The layout however cannot well be determined until the desk layout and office requirements are known. The wires of the systems should be run in conduits, using No. 16 rubber-covered wires, and taking current from the batteries of the nurses' call system. For desk work the conduits should be concealed in the floor slab and either bulb tees or waterproof floor boxes should be employed at the outlets, thus permitting a waterproof flush plate to be installed on the floor box in the event of changes being made in the location of the furniture.

The Clock System. Where standard time is required, the electric clock system is used, the master clock being located in the main corridor or in the office, with secondary movements throughout the corridors, in the kitchen, laundry, boiler house, offices and public rooms. The secondary clocks are of plain pattern, made up with smooth lines and without mouldings or corners; the clocks are finished in white enamel. Either the series or the multiple system may be used, the clocks operating from a storage battery at 24 volts. All wires are run in ½-inch conduit, the clock circuits leading back to the outlet of the master clock. All circuits are of No. 14 rubber-covered wire. With the series system not more than 18 clocks should be connected on one circuit; with the multiple system as many as 50 or 60 clocks may be connected on one circuit. The battery should be located in the service room, and two No. 12 wires carried from the battery to the master clock. It will be advisable to consider the installation of an automatic battery charger operated from the master clock. This instrument automatically charges the battery a determined number of minutes during each hour, thus keeping the battery always in good condition. The charger is located at the battery, and is connected in one of the clock circuits with No. 14 wire.

The Fire-alarm System. It is an open question as to whether a fire alarm system is to be desired in a fireproof hospital building, as there may be more danger from alarming the patients due to accidental operation of the system than from actual fire. Provision should be made in any event for a city box at a point near the hospital or in the hospital building. If a system is considered for the buildings, it should be of the closed circuit type, with alarm gongs in the boiler house and at such other points as may be necessary to call the hospital fire department in the event of an alarm's being rung in from any of the stations.

Watchman's Clocks. It is obvious that a watchman will not be required in the sections of the buildings where the nurses are on duty throughout the night, and any patrolling of these sections would prove disturbing to the patients. The basements, unoccupied sections, laundry, storerooms, etc., should be patrolled and some type of check on the watchman is required. If desired, a portable watchman's clock can be used, this carried by the watchman, the numbered keys being securely chained at the watchman's stations. The watchman carries the clock to the key and inserting the key in the clock "rings up" on the clock dial. This system requires no wiring. If the magneto system is desired, the master clock is located in the office, and a magneto of either the flush or surface type is installed at each station, the watchman inserting a portable crank in the station "rings up" on the master clock.

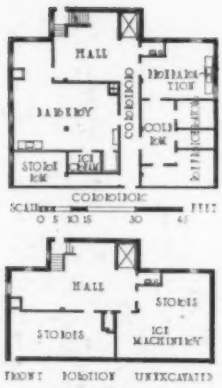
GENERAL VIEW OF INFIRMARY AND ADMINISTRATION BUILDING



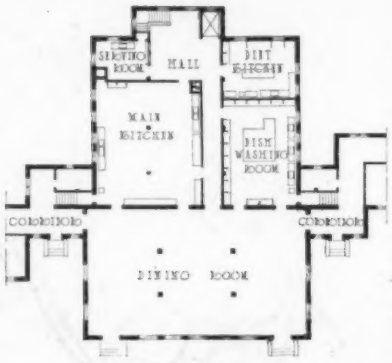
GROUP PLAN

MUNICIPAL TUBERCULOSIS SANITARIUM FOR CITY OF DETROIT,
NORTHVILLE TOWNSHIP, WAYNE COUNTY, MICH.

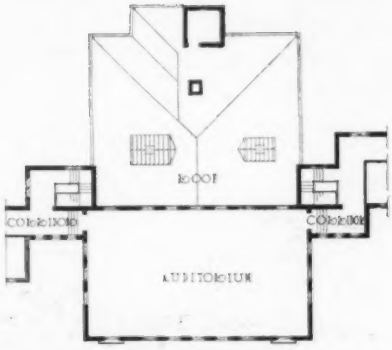
STRATTON & SNYDER, ARCHITECTS



BASEMENT AND SUB-BASEMENT PLANS



FIRST FLOOR PLAN

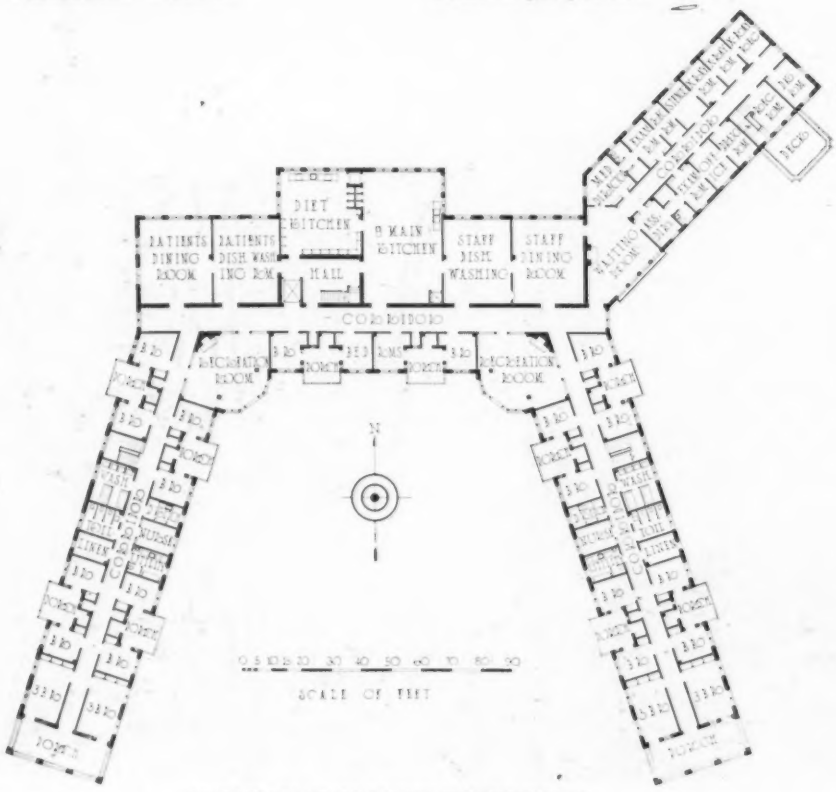


SECOND FLOOR PLAN

SERVICE BUILDING
MUNICIPAL TUBERCULOSIS SANITARIUM FOR CITY OF DETROIT

Illustrations on Plates 102 and 103

Type of construction. Semi-fireproof
Exterior walls. Face brick and hollow tile backing
Roofs. Tile
Floors. Tile and oak on reinforced concrete
Heating. Vapor vacuum
Ventilation. Natural
Windows. Casement
Area of building. 200,637 sq. ft.
Cubage of building. 2,639,762 cu. ft.
Date of general contract. March, 1920
Cost of building proper. $1,695,000
Cost per cu. ft. 64.2¢
Number of beds. 300
Cubic ft. per patient. 8,799



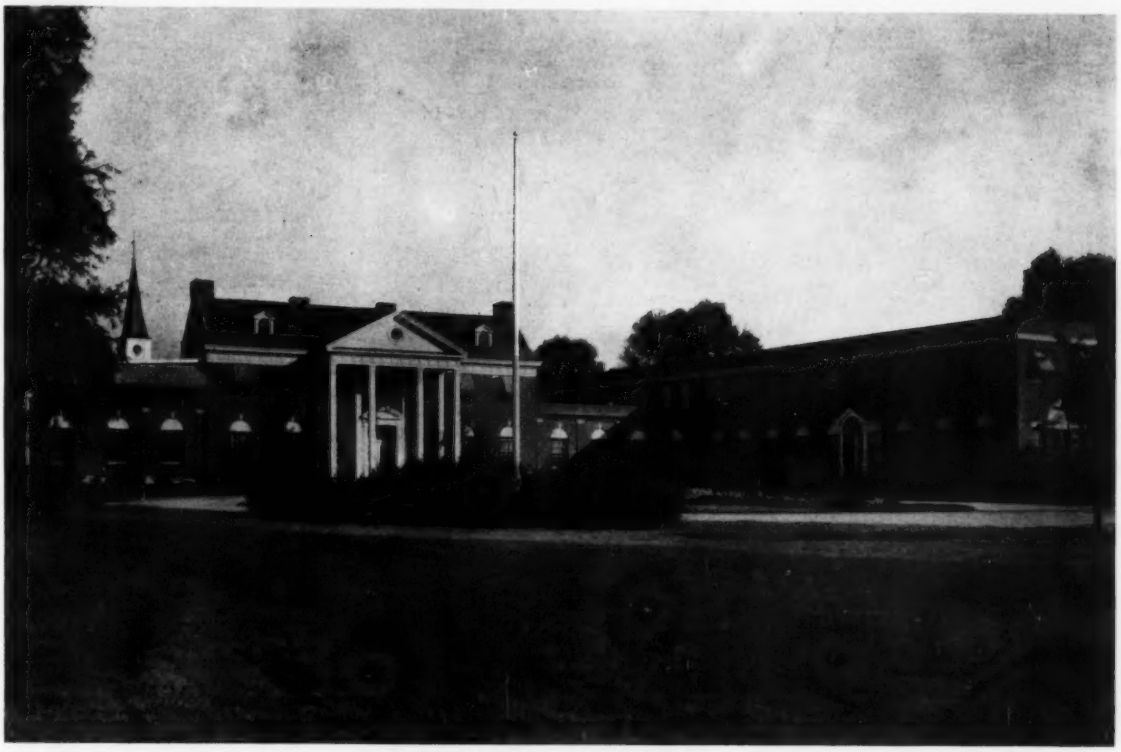
MAIN FLOOR PLAN OF INFIRMARY BUILDING

TYPICAL WARD BUILDING

DETAIL OF INFIRMARY BUILDING

MUNICIPAL TUBERCULOSIS SANITARIUM FOR CITY OF DETROIT,
NORTHVILLE TOWNSHIP, WAYNE COUNTY, MICH.

STRATTON & SNYDER, ARCHITECTS



CENTRAL PAVILION AND FORECOURT

DETAIL OF WARD BUILDINGS

GRASSLANDS HOSPITAL, EAST VIEW, N. Y.

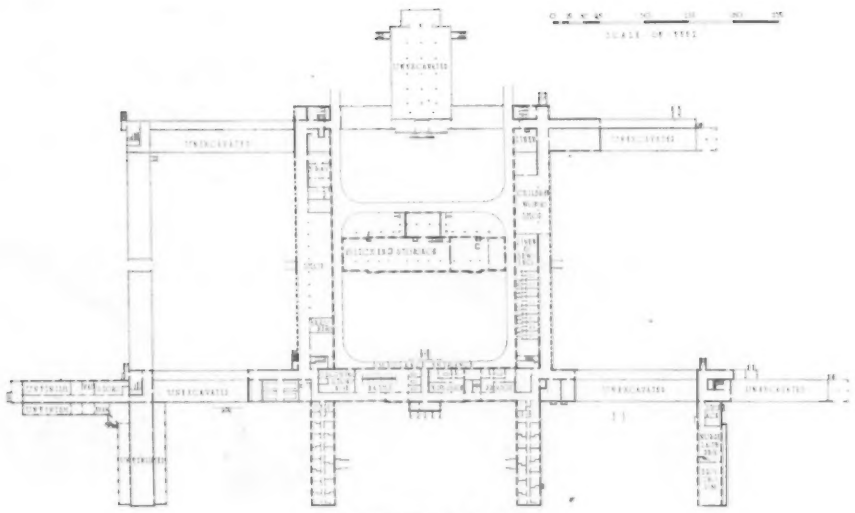
WALKER & GILLETTE, ARCHITECTS

GRASSLANDS HOSPITAL
EAST VIEW, N. Y.

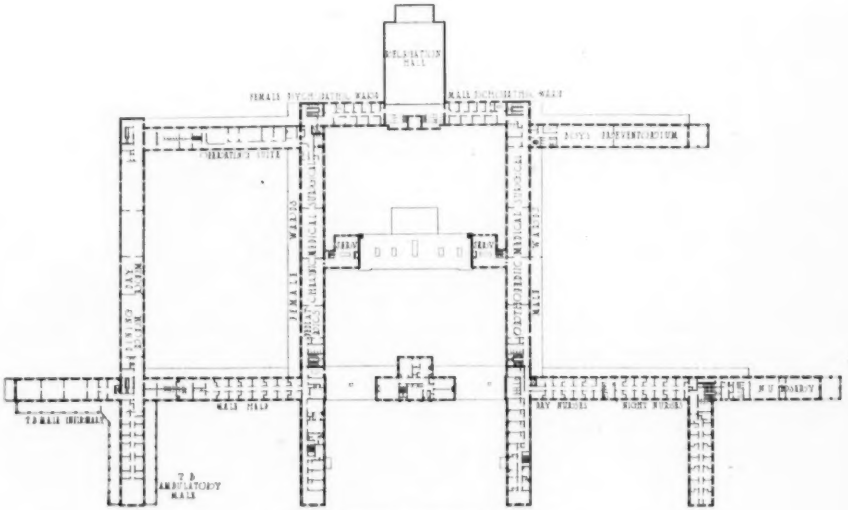
Illustrations on Plates 104 and 105

Type of construction. Fireproof
Exterior walls. Brick
Roofs. Slag
Floors. Concrete and linoleum
Heating. Hot water
Ventilation. Natural
Windows. Wood, double-hung
Date of general contract. 1917
Number of beds. 700
Cost of operating per day per bed. 55 3/5¢

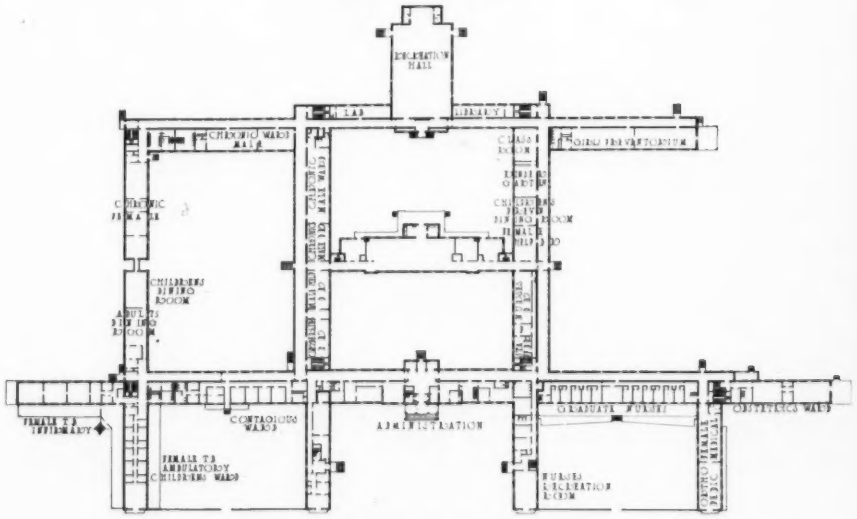
This is a large county institution, caring for all types of diseased on a charitable basis.



BASEMENT FLOOR PLAN



SECOND FLOOR PLAN

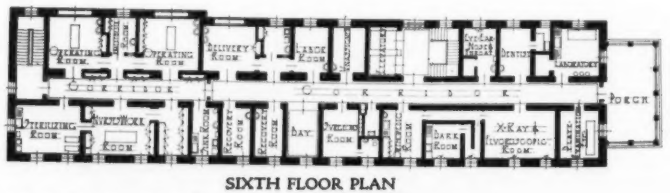


FIRST FLOOR PLAN

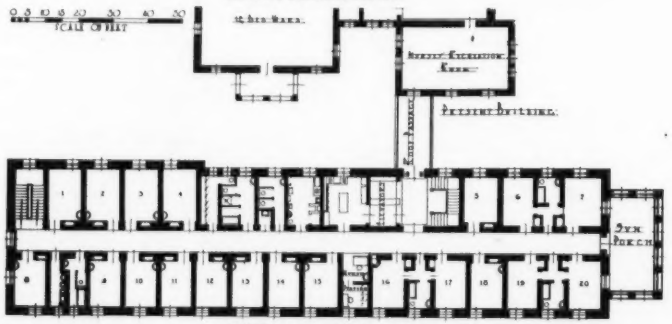
DETAIL OF ENTRANCE PORTICO

GRASSLANDS HOSPITAL, EAST VIEW, N. Y.

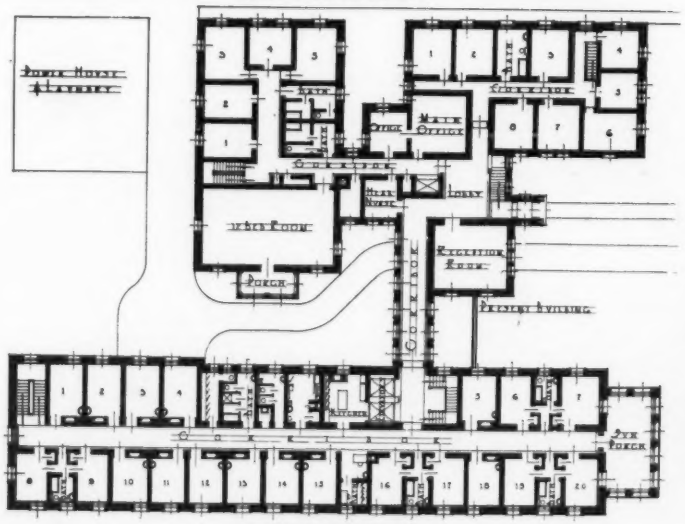
WALKER & GILLETTE, ARCHITECTS



SIXTH FLOOR PLAN



TYPICAL FLOOR PLAN



FIRST FLOOR PLAN

GENERAL EXTERIOR VIEW

UNION HOSPITAL, TERRE HAUTE, IND.

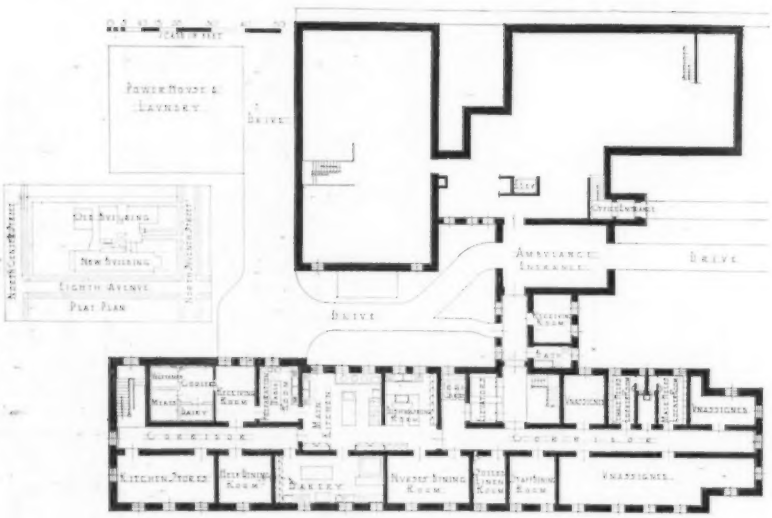
JOHNSON, MILLER & MILLER, ARCHITECTS
STRATTON & SNYDER, CONSULTING ARCHITECTS

UNION HOSPITAL
TERRE HAUTE, IND.

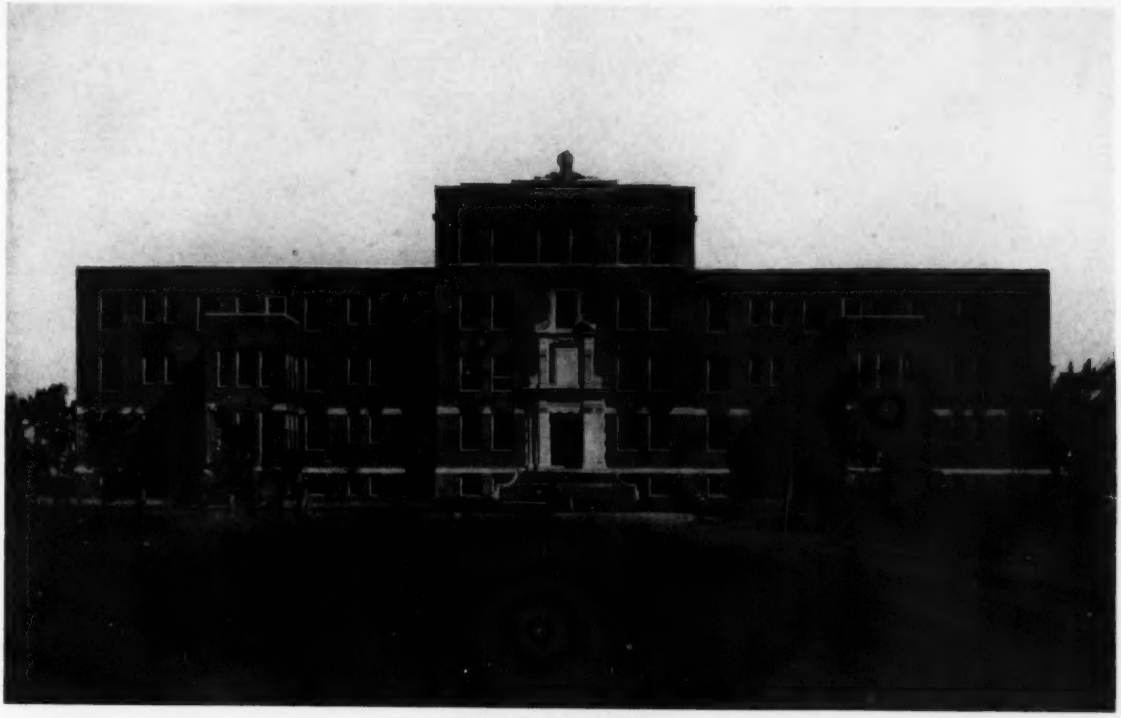
Illustrations on Plate 106

Type of construction. Fireproof
Exterior walls. Brick and stone
Roofs. Tar and gravel on concrete
Floors. Linoleum and concrete
Heating. Vacuum steam
Ventilation. Mechanical
Windows. Double-hung
Area of building. 6,786 sq. ft.
Cubage of building. 593,985 cu. ft.
Date of general contract. Dec., 1921
Cost of building proper. $350,000
Cost per cu. ft. 56.2¢
Number of beds. 100
Cubic ft. per patient. 5,940
Cost of operating per day per bed. $3.20

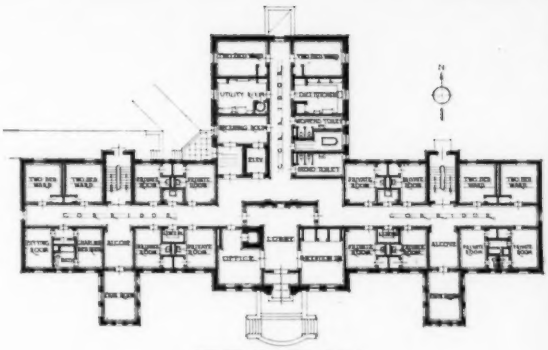
This construction includes the main kitchen and stores. Laundry, power plant and administration quarters in separate building.



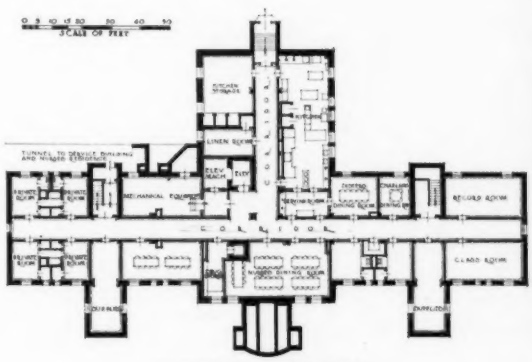
BASEMENT FLOOR PLAN



GENERAL EXTERIOR VIEW



FIRST FLOOR PLAN



BASEMENT FLOOR PLAN

DETAIL OF ENTRANCE FRONT

ST. JOSEPH'S HOSPITAL, MITCHELL, S. D.

EDWIN H. LUNDIE, ARCHITECT

ST. JOSEPH'S HOSPITAL
MITCHELL, S. D.

Illustrations on Plate 107

Type of construction. Reinforced concrete; clay tile and brick partitions
Exterior walls. Brick and limestone
Roofs. Reinforced concrete and gravel
Floors. Cement, tile and terrazzo
Heating. Vacuum steam
Ventilation. Exhaust in kitchen only
Windows. Double-hung wood sash; steel sash for operating room
Area of building. 9,488 sq. ft.
Cubage of building. 467,115 cu. ft.
Date of general contract. August, 1921
Cost of building proper. $212,721
Cost per cu. ft. 45½¢
Number of beds. 87
Cubic ft. per patient. 5,369
Cost of operating per day per bed. $2.50–$3.00

This construction includes main kitchen. Laundry, power plant and nurses' residence in separate buildings.

FOURTH FLOOR PLAN

SECOND FLOOR PLAN

THIRD FLOOR PLAN

Hospital Refrigeration

By J. F. MUSSELMAN, M.E.
Consulting Engineer, New York

AS hospital equipment of every kind has developed, improved and, to a certain extent, been standardized, the use of natural ice for refrigeration and water cooling is almost a thing of the past; so nearly so, in fact, that the plant of today must be on a very small scale or the conditions very unusual to justify the omission of some sort of a system of mechanical refrigeration.

Reasons are many for the abandonment of the use of ice, but the ever increasing avarice of the iceman probably had almost as much to do with it as the simplification and betterment of the mechanical refrigerating plant. Then again, the demand for lower temperatures in certain refrigerators than can be had with ice has become more persistent as the high cost of spoiled foodstuffs goes higher. Refrigerating machines in smaller sizes and with automatic devices to stop and start, as required to maintain a uniform box temperature, have made possible the use of mechanical refrigeration in plants and in individual buildings that would have been, until recently, too small to warrant use of anything but ice.

There are so many factors involved in the question of the advisability of installing a system of mechanical refrigeration for a hospital building or group of buildings that no hard and fixed rule can be laid down, but it may be said conservatively that for any hospital with a capacity of 50 or more beds, in which it is a question of either buying ice from some outside source or installing a mechanical refrigerating apparatus, it is advisable, at least from a standpoint of convenience, to use mechanical refrigeration. For so small a hospital as 50 beds, if electricity has to be bought at usual rates and with an operating force in the engineering department as indifferent and inefficient as is often found in the smaller institutions, the mechanical refrigerating plant will not be an economical investment, but at least it will be a genuinely popular luxury. The size of the plant required for a hospital of a given size will vary widely with conditions, but not materially with the climate. For average conditions, four tons of refrigerating capacity will be required per hundred beds to take care of the cooling, drinking water and ice.

Mechanical refrigeration is least advisable, of course, where a dependable source of pure natural ice exists in the immediate vicinity of the buildings. This involves an icehouse and a considerable amount of labor in handling, but it effects such a substantial saving in the operating cost of the institution that it is popular even though it be primitive. The use of natural ice at the price of the harvesting is advantageous, too, in the small boxes of isolated buildings too far removed from the service building to permit the circulation of brine.

Before discussing the comparative advantages of the different types of mechanical refrigerating systems, it is well to consider the question of how extensive the system should be; that is, whether it is better to pipe brine from the central plant to every individual box in every building or to use separate small refrigerating plants (what might be known as unit machines) in buildings and boxes located at a distance from the central plant. For a single small refrigerator box, widely removed from the central plant and from all other boxes, almost any expedient is better than pumping frigid brine through long lengths of hot pipe tunnel where it can trade heat with the steam and hot water piping. The extravagance of such a trade can be appreciated when the fact is considered that every heat unit absorbed by the brine mains costs at least five times as much to generate as the heat unit lost by the steam or the hot water mains, but to make matters worse, in this case, both the heat absorbed and the heat lost constitute a net loss.

The unit system of refrigeration eliminates the transmission losses and is thermostatically controlled, which considerably reduces another source of waste, that is, carrying the boxes too cold. For these reasons the unit system, in spite of the inherent inefficiency of miniature units, is more economical than any kind of a central system, if the boxes to be cooled are very much separated. But at the present state of development these refrigerating units are subject to criticism on two scores: first, they are likely to be objectionably noisy in the diet kitchens, especially if the diet kitchen is adjacent to a ward or private room; then they are, in spite of all claims to the contrary, so delicate in construction and adjustment as to require competent attention now and then and a considerable amount of repairs. But they are being improved steadily, and before long we may expect them to demand no more operating attention than an automatic dumbwaiter or the family washing machine.

For the central plants of hospitals, three distinct types of system have been widely used. Each has its champions and each has peculiar advantages for specific conditions. The ammonia compression system has been more widely used than any of the others, but a compression system using a refrigerant other than ammonia is gaining wide favor of late. The third, the ammonia absorption system, under some conditions shows greater economy than either of the others and is surely as simple and easily operated as a refrigerating machine can be made. The ammonia compression system has been used so widely and is understood so generally that it is usually first thought of when refrigeration is considered. This type of plant has been somewhat improved within the last few years by the addition

of an automatic feature designed to start and stop the compressor as the box temperatures require.

It is not considered safe to pipe the high pressure ammonia into the boxes, especially the boxes in the hospital proper, for the pressure is high, probably 160 pounds per square inch on the average, and however the piping is done, it sometimes bursts with disastrous results. For this reason, if for no other, it is customary to confine all of the ammonia piping and equipment to the central machinery room, which it is well to isolate from other parts of the building. With this system, in fact with any ammonia system, brine is used as a cooling medium. For a high building with refrigerators on the upper floors, supplying the power required to pump the brine becomes a matter of considerable expense if an open system of piping is used. For this reason the most economical results can be accomplished by completely separating the brine used for box refrigerating from that of the ice-making plant, in this way using a closed brine cooler and a closed system of piping. The only danger with this latter scheme is that of the brine's freezing and bursting the brine cooler if the pump should stop.

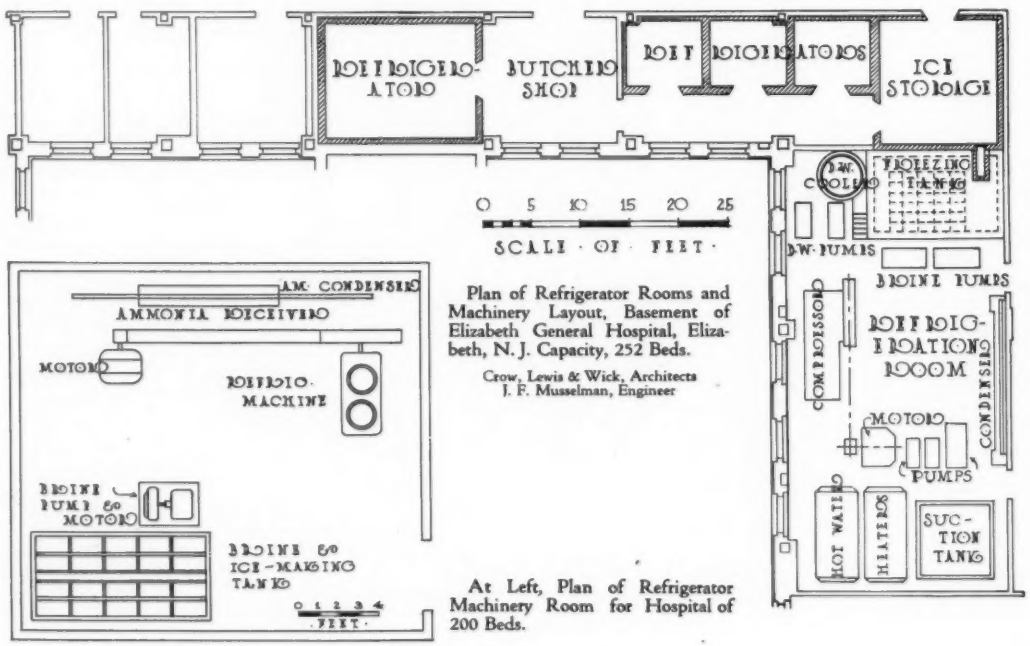
A compression system using a refrigerant less hazardous than ammonia obviates the necessity of separating the plant from the load and makes possible the use of direct expansion in the refrigerators without danger. A plant of this kind can be placed in the immediate vicinity of the main storage refrigerators without danger and with the minimum radiation loss from distribution piping. This point alone will often justify the selection of such a system. What is probably the best developed and most popular of the machines of this general type uses as a refrigerant carbon dioxide, the physical characteristics of which involve a tremendous head pressure, but which nevertheless is perfectly safe on account of the harmlessness of the gas.

The ammonia absorption system deserves wider use than it has had, on account of the high over-all operating efficiency that can be effected by its use in conjunction with steam-driven pumps operated against a high back pressure, of 10 pounds or so, with their exhaust used in the generator.

With a central system of refrigeration, use of a circulated system of frigid drinking water is certainly advisable in any hospital. An ice water faucet in every diet kitchen and utility room is a convenience that every nurse will regard as a labor-saver, to say nothing of increasing the possibility of patients' getting water which is less than lukewarm.

An ice-making plant is not necessarily a part of every hospital refrigerating plant, and if ice can be bought reasonably it is doubtful if a central freezing plant will be an economical investment for a hospital of less than 100-bed capacity.

A vital point in connection with installation of any refrigerating plant that is sometimes overlooked is the necessary space for brine pipes. These must be insulated and insulated well. A comparatively small brine pipe will be 7 inches in diameter with its covering on, and any limitation in space for such pipes involves not only a heat loss but a sweating of the pipes with all of its possibilities for damage. These pipes should be exposed if possible and readily renewed, as there is small possibility of brine pipes' lasting as long as the building does. It is also imperative that the brine and drinking water pipes be kept as far as possible away from steam and hot water pipes, and never run in the same furring or pipe shafts.



Plan of Refrigerator Rooms and Machinery Layout, Basement of Elizabeth General Hospital, Elizabeth, N. J. Capacity, 252 Beds.

Crow, Lewis & Wick, Architects
J. F. Musselman, Engineer

At Left, Plan of Refrigerator Machinery Room for Hospital of 200 Beds.

Hospital Construction and Costs

By EDWARD H. HOYT, A.I.A.
Haven & Hoyt, Architects, Boston

IN approaching a consideration of contemplated new hospital construction the question frequently arises as to whether it shall be of fireproof or of non-fireproof type. Very often committees and individuals, while recognizing the many advantages and great desirability of non-combustible accommodation, incline to use of the non-fireproof or possibly a semi-fireproof type, actuated by motives of economy and fear of the difficulties to be encountered in providing the requisite funds. Where conditions warrant one-story structures, wooden construction would appear to be permissible from the point of view of the safety of the occupants, but buildings of combustible type, even with masonry exterior walls, are generally not morally justified in excess of two stories in height.

Favorable initial cost, outside of consideration of the length of the construction period, would appear to be the sole argument in favor of non-fireproof hospital buildings, while the advantages with respect to maintenance costs are decidedly in favor of the fireproof type; there is the greater assurance of safety, and preservation of hospital facilities is substantially guaranteed.

If the materials for the interiors of fireproof buildings have been wisely chosen, the cost of renewals and repairs and of the general upkeep is reduced to a minimum, and if the designer has investigated and met the detailed requirements of insurance interests, very favorable premiums are obtained. On the other hand, non-fireproof buildings for hospital occupancy deteriorate very rapidly in spite of good intentions with respect to care, and insurance premiums obviously are always bound to be high.

In some instances hospitals are so arranged that the patients are housed in fireproof structures, and other buildings of the group are of poorer type, possibly protected with sprinkler or other equipment, but the strength of a chain is measured by its weakest link, and the same truths that apply to other purchases seem applicable to hospital buildings, the best being usually deemed the cheapest eventually. Another point of importance is the selling value of safe construction to the public seeking hospital accommodations, for a lack of patronage, particularly for the higher grade income-earning space, is quite as disastrous for a hospital organization as for any other business, and the managements of such institutions, to be successful, must recognize business principles, or the quite frequent annual deficit is bound to be greatly increased.

With respect to the selection of materials for hospital construction there is not much to be said in connection with non-fireproof buildings since, for financial reasons, the usual methods, analogous to those of dwelling house construction, are generally adopted. It is of minor importance whether the wooden construction is covered externally with brick veneer, stucco, wood or other inexpensive material. If the exterior hazard is by chance reduced, it is simply a question of degree, and that of the interior will still exist, and from the nature of conditions a general deterioration is at once well under way.

The materials required for fireproof hospital construction, generally speaking, are the same as those used in buildings of that type designed for occupancy of different character, and are to be had in no inconsiderable variety, the selection for the various uses depending upon choice, permanency, availability, distance from source of supply, and other obvious considerations. The necessity for the use of money to extend the greater usefulness and efficiency of an institution appears to preclude other than buildings of simple design and substantial construction, over-ornate buildings finding no justification, due to their unwarranted extravagance and the generally ensuing lack of funds to provide for their maintenance. Among many of the groups, the functioning of which is most widely commended, are to be found buildings with handsome, well selected brick exteriors with restrained use of stone or other suitable trimmings, the floors and roofs of which are of concrete or other standardized construction and with interior walls and partitions of terra cotta or other masonry or the equivalent.

The term "semi-fireproof construction" appears to have received no standardization, but to have resulted from influences frequently exerted to secure economies in cost of construction, and the term would suggest a use of certain combustible materials at unimportant points in structures otherwise non-combustible. Such expediencies as the use of fireproof floors, but with wood stud dividing partitions, or the dividing of a combustible building into zones with masonry walls, are examples of what could be done in this respect. In such instances, however, staircases should be fireproof or at least contained in fireproof enclosures.

In Massachusetts there is at least one instance where a protected mill frame, wood roof construction, on an otherwise first class, fireproof building, was accepted as the equivalent of fireproof construction by insurance interests and the local inspection authorities. In this case the roof was protected with slate exterior surfacing, and the wood was fireproofed on the inside with metal lath and cement mortar 1 inch thick, so applied as to leave no air spaces. Wood construction afforded the best possible nailing for the slate, and in the opinion of the writer such construction need not be considered as inferior for pitched roofs. It could not, with any assurance of safety, be used, however, on flat roofs,

and suspended internal protection on the under side of rafters, leaving air flues, should be considered as decidedly inferior, and of no benefit with respect to decreasing the amount of insurance premiums.

From the standpoint of consideration of interior trim for hospital buildings, it is not generally understood that the term "fireproof" would mean that the trim could not be of wood, either in whole or in part. It is probably safe to say that in most instances wood trim, doors and window construction would be found. The modern use of terrazzo, mosaic or other similar floor surfacing naturally and obviously precludes the use of wood bases in connection therewith for sanitary and other reasons.

Since the title of this article refers to costs, and since the foregoing observations treat of types of construction rather than types of plan, it should be said that the layout of an institution has a distinct bearing on its cost, depending on whether it is of a block type, pavilion, cottage or composite type. Other considerations being equal, the block type may be considered financially more favorable for several reasons, among them, in that the percentage of enclosing walls is smaller than in instances where there are many detached units. When the latter type is selected it is for the sake of definite advantages that appear to warrant the added expenditure.

Since there is no actual standardization of hospital layouts, obviously difficulties are encountered in attempting to give definite guides to hospital construction costs, because of the great variation of standards, the ever-present influence of local conditions, and the vast difference of demand for built-in laboratory and other equipment for treatment and research purposes.

The antiquated method of measuring hospital construction cost by the unit cost per bed is illogical and is often attended with danger, since the comprehensive, complete institution suffers by comparison with one affording but limited accommodations and service. Such comparisons are constantly being made when knowledge of conditions is lacking, and cost comparisons are too often made without full knowledge of conditions as to type of construction, scope of facilities, or as to whether heating and other services are from outside plant or otherwise.

The fact that no standard height of hospital building has been established, and the fact that materials and finishes greatly vary, appear to prove the square foot unit cost as being of no material value in arriving at construction costs. The unit costs per cubic foot, however, based on known conditions with respect to existing buildings, would appear to be a safe method of arriving at an approximate cost of the various types, proper allowance being made for variations due to local conditions of site, market conditions and equipment.

If a cubic foot unit cost is to be of value, consideration may well be given to a reduction of the cubic volume, and centralization in many respects may be cited as a possible aid to such accomplishment. Much can be achieved in this respect by proper attention to provision for centralizing food distribution, arrangement of sterilization, care of patients' clothing and by care in avoiding other unnecessary duplication. Particular consideration of centralization has been given in the planning of the new Fifth Avenue Hospital in New York, with the apparent result of a considerable increase in the space available for patients. Outside of construction cost, it is hoped that this institution, arranged throughout with private rooms, may show results comparing favorably with open ward plants, where a similar cubic volume per patient is provided. The operation of this plant will be watched with interest.

As an example of the value of the cubic foot unit method of reasoning, a survey of some ten hospitals recently built indicates that an allowance of from 7,000 to 8,000 cubic feet per bed should provide for the full requirements of an average, general hospital, exclusive of the housing of nurses, and the same survey indicates that an additional allowance of slightly over 4,000 cubic feet should provide for this.

A further survey appears to disclose other interesting facts regarding some 50 institutions of fireproof construction, of various types of design:

General hospitals of about 100-bed capacity, situated away from the larger centers of population and supplied with the minimum of laboratory, operating, and plumbing equipment, average in cost 48 cents per cubic foot.

General hospitals ranging in capacity from 100 to 250 beds, fully representative of good modern practice in planning, construction and equipment, average in cost 57 cents.

Large hospitals in metropolitan centers, with a large proportion of private rooms and very fully equipped for medical and surgical research and of the best type of construction, average 75 cents.

Institutional buildings, chiefly for the care of the aged and invalids, and with no operating rooms and with the minimum of administration and medical treatment space, average in cost 42 cents.

Additions to hospitals, in which heating, laundry, kitchen and similar services are supplied from existing buildings, average in cost for mixed ward and private room pavilions 50 cents.

Nurses' homes with suitable public rooms, training schools, and adequate plumbing facilities average in cost 52 cents.

These figures are based on contracts made during 1921 and 1922, and they do not include costs of hospital equipment and furnishing.

In conclusion, it would appear that a low construction cost does not necessarily mean the highest efficiency. There are three important elements involved; namely, construction cost, operating cost, and maintenance cost. The highest degree of success would appear to be shown by the best all around functioning of the plant, the cubic volume of which results in an economical construction cost without sacrifice of the facilities of the plan providing for reasonable operating cost, or of use of the materials which insure low maintenance charges.

The Housing of Staff and Employes

By OLOF Z. CERVIN
Cervin & Horn, Architects, Rock Island, Ill.

A PROBLEM is well on the way toward solution if all its limiting conditions can be stated, and when a nurses' home is being considered surely the most important would be the number and character of the staff and employes.

As a concrete illustration a mid-western hospital with a capacity of 140 beds has been selected. The list of employes furnished by the superintendent is quite formidable, and includes:

1 superintendent.	8 house maids.
1 assistant.	3 cooks and assistants.
1 head nurse.	2 dining room maids.
1 instructor.	2 scrub women.
3 floor nurses.	4 laundry women.
1 dietitian.	1 engineer.
1 operating room nurse.	1 janitor
60 undergraduate nurses.	1 laundry man.
15 special nurses.	1 fireman.
6 internes.	1 houseman.

1 orderly.

Two solutions are given of a nurses' home. Figs. 1, 2 and 3 show a recently completed motherhouse for 50 sisters, which is really a nurses' home, excepting that the sisters are of a more advanced age and live their mature lives in the home instead of a few years while training.

The first floor plan shows a large combination living room and library, with a connecting porch and a commodious dining room, all of which rooms can be thrown together for special occasions. Adjoining the kitchen is a room where the nurses and staff with their guests drop in every afternoon between three and four o'clock for a cup of tea. There are two classrooms which can be thrown together and used for large classes and for devotional purposes. The second floor plan shows the typical single bedrooms, each with an unusually large closet. The closet arrangement is quite suitable for a home of this kind, but a better arrangement will be shown later when discussing the next plan. On this second floor is a large room for the sister superior and a smaller one for her assistant, with a private bath between. The sister superior's room has a disappearing bed, which, however, is not quite so good as to plan a suite, a living room and separate bedroom. Two rooms will be noted as forming a suite, the one a living room and the other a bedroom with two beds. A further development of this combination will be shown later. An important feature of this second floor is the sewing room, well equipped with electric plugs, ironing boards, a wide and long table, a wall case, and two spacious closets for linen. A door leads to the porch roof. The number of fixtures in the general bath and toilets are the very minimum, and a good rule is for each 18 nurses:

2 bath tubs.	3 stools.
1 shower.	5 wash basins.

1 dental lavatory.

The basement contains a small laundry, a feature which should not be overlooked as supplementing the large general laundry, the nurses requiring a place to do up those pieces which are needed in a hurry or which must not be sent to the main laundry.

A large nurses' home of six stories and basement with capacity of 134 beds is illustrated in Figs. 4, 5 and 6 (a preliminary study for building upon a peculiarly shaped lot), which has several important features not provided in the motherhouse. Among them may be noted in the basement a large gymnasium 13 feet high, a locker room, a storage room, a swimming pool and showers.

The recreational facilities for the nurses should receive careful attention and should include, besides a gymnasium and pool, a social

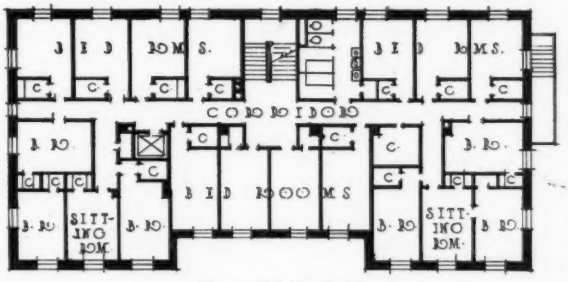


Fig. 3. Third Floor Plan

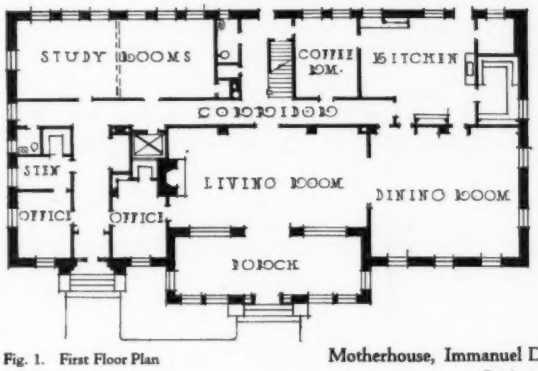


Fig. 1. First Floor Plan

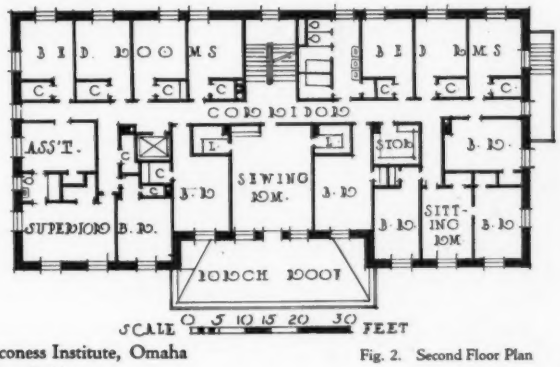


Fig. 2. Second Floor Plan

Motherhouse, Immanuel Deaconess Institute, Omaha
Cervin & Horn, Architects

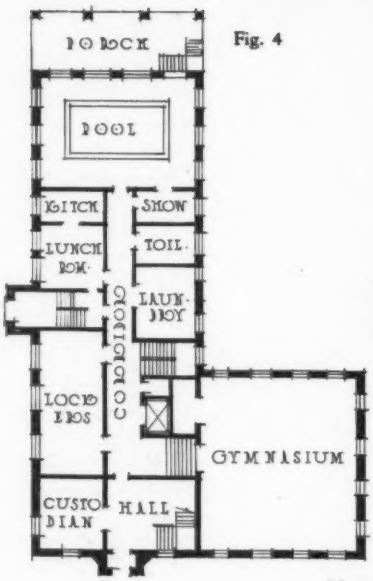


Fig. 4

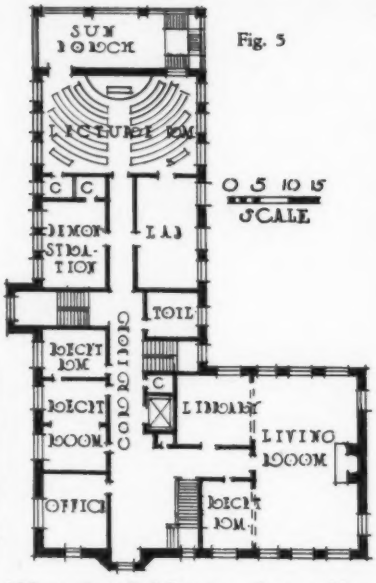


Fig. 5

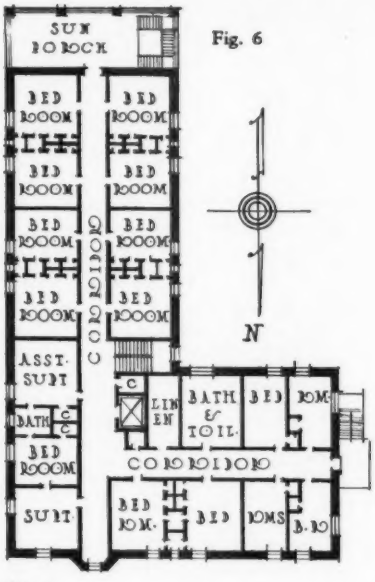


Fig. 6

Nurses' Home of 134-Bed Capacity. Cervin & Horn, Architects

or living room, a library, tennis courts either on the ground or on the roof, and if possible a garden and a sun porch for each story. Owing to the first cost and the subsequent upkeep of the swimming pool it is quite likely that few nurses' homes can afford this feature, but all other mentioned facilities should be included.

The living room is the one room of the home which will have most to do with keeping the nurses contented. The architect should avoid making this room formal, with stiff pilasters and cornices and an excessive ceiling height. The furniture and the decorations should be selected for livableness. Here, too, there will be dancing, and the floor should be finished accordingly. To the recreational features belong the kitchenette with a small lunch room for use with the informal parties of the nurses.

The educational features include a large lecture room, a laboratory for chemistry and biology, a demonstration room with beds and dummies, and storerooms. The lecture room should be provided liberally with blackboards. Back of the instructor the blackboard should be double, one portion sliding up for work which is to be maintained for any length of time. The laboratory should have 10 or 12 feet of blackboard. In the lecture room there should be cupboards, or a small room should be provided for storage of apparatus. An instructor's room would have been added if space had permitted. Outlet for a stereopticon should be provided in the lecture room, and it would be well to make provision also for a motion picture machine.

The important unit of the nurses' home is the bedroom. The arrangement in the motherhouse with a large closet at the entrance is uneconomical, producing a small hallway, which though adding to the privacy and desirability of the sister's room is in an ordinary nurses' home not essential. A better plan is shown in Fig. 7, where wardrobes are so arranged that no space whatever is lost, the small alcove serving as a recess for the dresser. Incidentally, it is to be regretted that so many nurses' homes are arranged with the beds in the front portion of the rooms next to the windows, making it impossible to keep these pleasant parts of the rooms attractive for lounging purposes and when reading or studying, although it is true that ventilation is somewhat better with the beds near the windows.

There is considerable disagreement as to whether the nurses prefer single rooms or for sociability would rather be two in a room. It is probably best to provide at least 20 per cent single rooms and to have the rest two in a room for economy's sake.

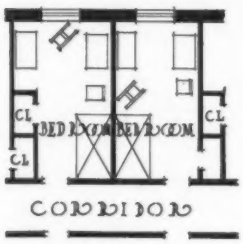


Fig. 7

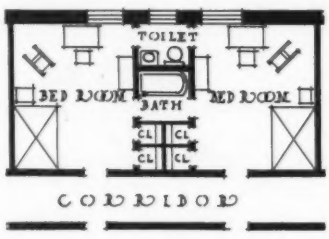


Fig. 8

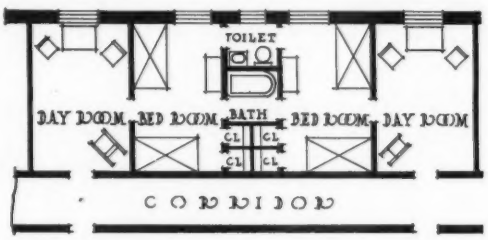
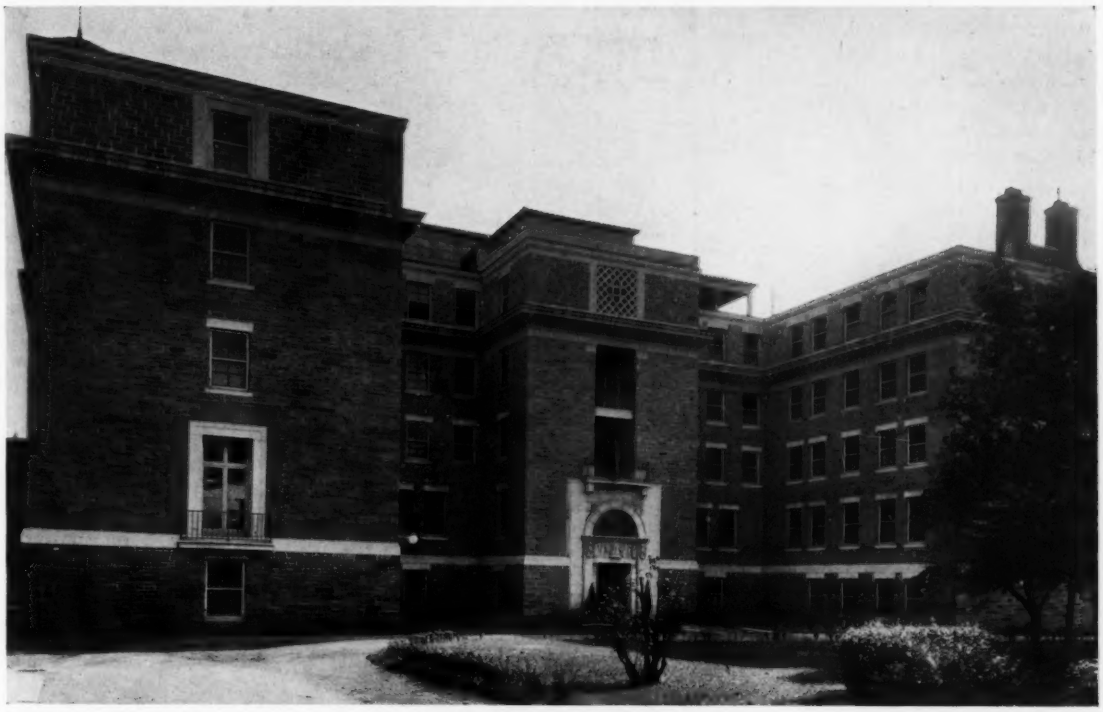


Fig. 9

(Continued on page 308)

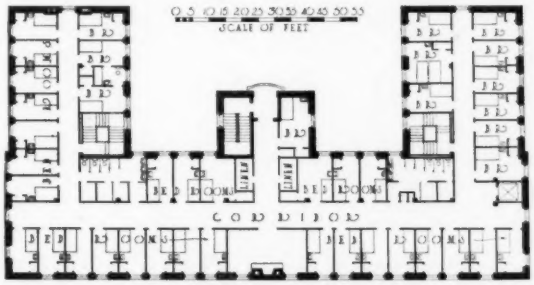
Nurses' Home of St. Agnes' Hospital, Philadelphia

FRANK R. WATSON, ARCHITECT



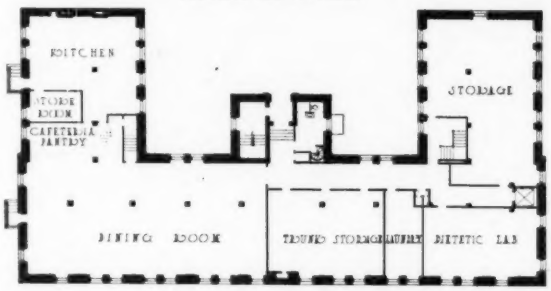
GENERAL VIEW OF EXTERIOR

THIS building accommodates 125 nurses. Construction is fireproof. Built January, 1921; cubage 596,505 cubic feet. Cost $322,112, or 54 cents per cubic foot. Contains kitchen and laundry for the nurses, heating from central power house.

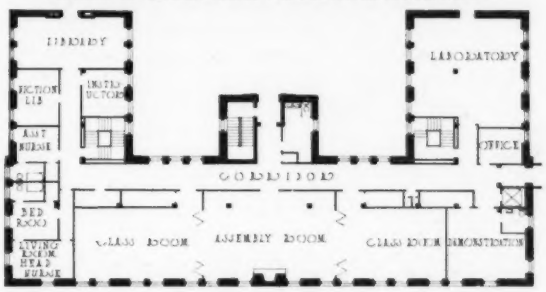


TYPICAL FLOOR PLAN

DETAIL OF SCULPTURED PANEL OVER ENTRANCE



BASEMENT FLOOR PLAN



FIRST FLOOR PLAN

The single rooms should be close to the toilets. The arrangement shown in the nurses' home, Figs. 4, 5 and 6, with toilets between two rooms and a separate closet for each nurse, has been found very acceptable. The bath tubs and showers are arranged to be used in common. Fig. 8 is from a lately finished nurses' home in Chicago, which is unusually good and of a fine type adopted only too rarely. The nurses will appreciate the added comfort of the private bathrooms.

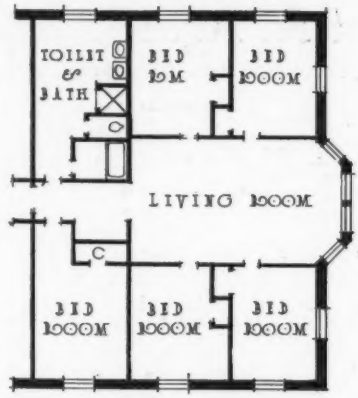


Fig. 10. Plan of Living Quarters for Five Internes

A further development shown in Fig. 9, which might be called a *de luxe* treatment, provides a sitting room 10 x 15 for two nurses, with an adjoining bedroom 9 x 15 having a separate closet for each nurse and toilet and bath placed between two suites and used by four nurses. The great advantage of this plan is in freeing the sitting rooms of beds and having the bedrooms so arranged that the windows can be left wide open throughout the year without chilling the sitting rooms which can thus be used for dressing rooms with no danger of freezing the plumbing.

In addition to the standard nurses' rooms, special provision must be made for the superintendent and, if the building is large, for the housemother. Each should have a living room, bedroom and private bath. The assistant superintendent, the head nurse, dietitian and the floor nurses, the instructor and the operating room nurse should each have special accommodations consisting of an individual bedroom with a private bathroom between two rooms. Again, these graduate nurses could well be given a separate wing in the build ng to themselves with individual rooms, general bath and toilets for their own use and a commodious living room in common.

It is important to provide sleeping accommodations for the night nurses, as they will require as much freedom from noise as possible and plenty of air with the daylight excluded. Several homes have commodious dormitories in the attics or on the roofs for these night nurses. Toilet accommodations should not be overlooked.

Each floor of the nurses' home should have a large linen store closet and one or two telephone booths with light, fans, pencils and pads. The special nurses must also be taken care of. They should be given, according to their number, dressing rooms and lockers and rest rooms with toilets. It is often found desirable to provide this accommodation in the hospital itself rather than in the nurses' home.

Fig. 10 illustrates a treatment of the internes' quarters. A large living room with bay window and space for billiard table, an individual bedroom and closet for each of five physicians, liberal toilet facilities, and an entrance hall with recess for hats and coats make a comfortable arrangement which would help to get and hold internes in these days of scarcity. The housing of the general employes and domestics is, as will be seen from the list at the beginning of this article, no trifling matter, if the hospital contains 100 or more beds.

Owing to the difference in their previous training and surroundings it is not necessary to plan as elaborately for the general employes and domestics as for the nurses, although of course if the funds permit it will add to their satisfaction and peace of mind if a common living room is provided for each sex, with some recreational features. The rooms should be individual, even if quite small. For a 40- or 50-bed hospital it is quite sufficient to provide one room for the janitor and one for the fireman, one room for a cook and one for a maid, and depend on outside help for scrubbing and cleaning. If the hospital is built on a hillside the basement, provided it is well out of the ground, can be used for many of the employes with the sexes well separated and if possible in opposite wings, completely equipped with toilets and baths. One small apartment for the head janitor and his family would be found acceptable.

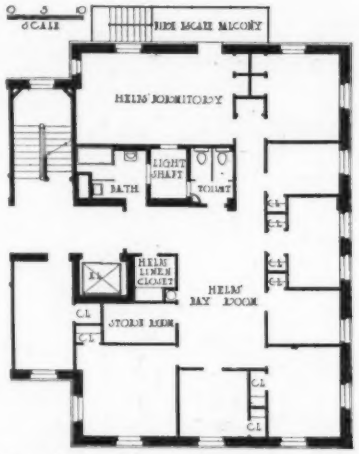
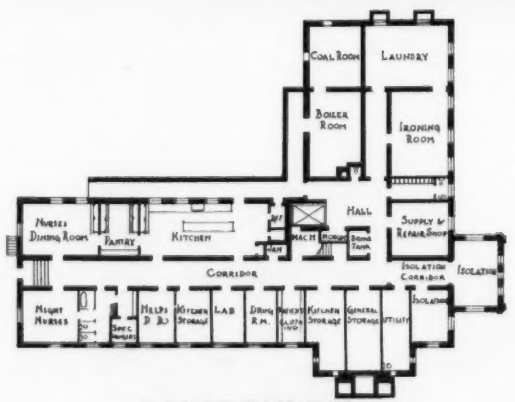


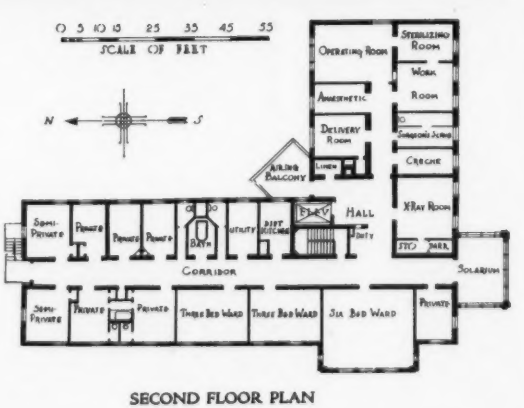
Fig. 11. Plan of Section Closed with Double Doors for Help's Quarters, Providing a Total Accommodation for 22 People

Fig. 11 illustrates one solution of the housing of the help in a portion of the building entirely closed off with double doors, but close to one of the stairways and the elevator. The plan provides for a large day room, skylighted, and surrounded by the various bedrooms of which there are two single rooms, two rooms for two, two rooms for three, one room for four, and a dormitory for six. There is in this self-contained unit a bathroom with a laundry tray and a toilet in a separate room; also a large linen room and a storeroom for trunks.



BASEMENT FLOOR PLAN

FIRST FLOOR PLAN



SECOND FLOOR PLAN

MARY FRANCES SKIFF HOSPITAL, NEWTON, IA.

CERVIN & HORN, ARCHITECTS

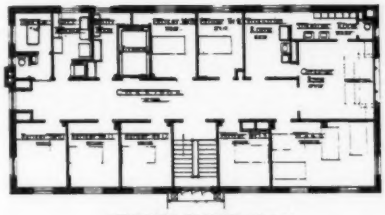
MARY FRANCES SKIFF HOSPITAL
NEWTON, IA.

Illustrations on Plate 108

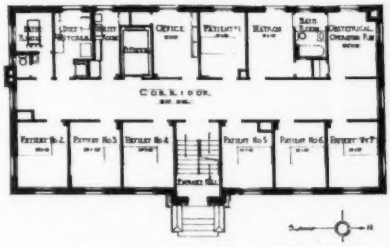
Type of construction. Fireproof
Exterior walls. Brick
Roofs. Terrazzo
Floors. Terrazzo
Heating. Vapor
Ventilation. Exhaust in kitchen and toilets
Windows. Wood, double-hung
Area of building. 7,116 sq. ft.
Cubage of building. 253,000 cu. ft.
Date of general contract. March, 1921
Cost of building proper. $142,000
Cost per cu. ft. 56¢
Number of beds. 50
Cubic ft. per patient. 5,060
Cost of operating per day per bed. $3.42

This construction includes kitchen, laundry and boiler room.

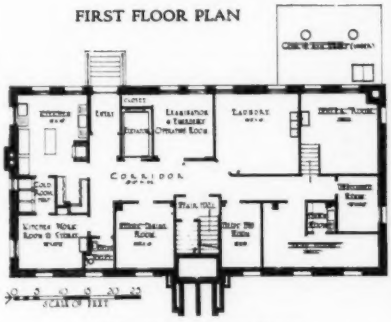
GENERAL EXTERIOR VIEW



SECOND FLOOR PLAN



FIRST FLOOR PLAN



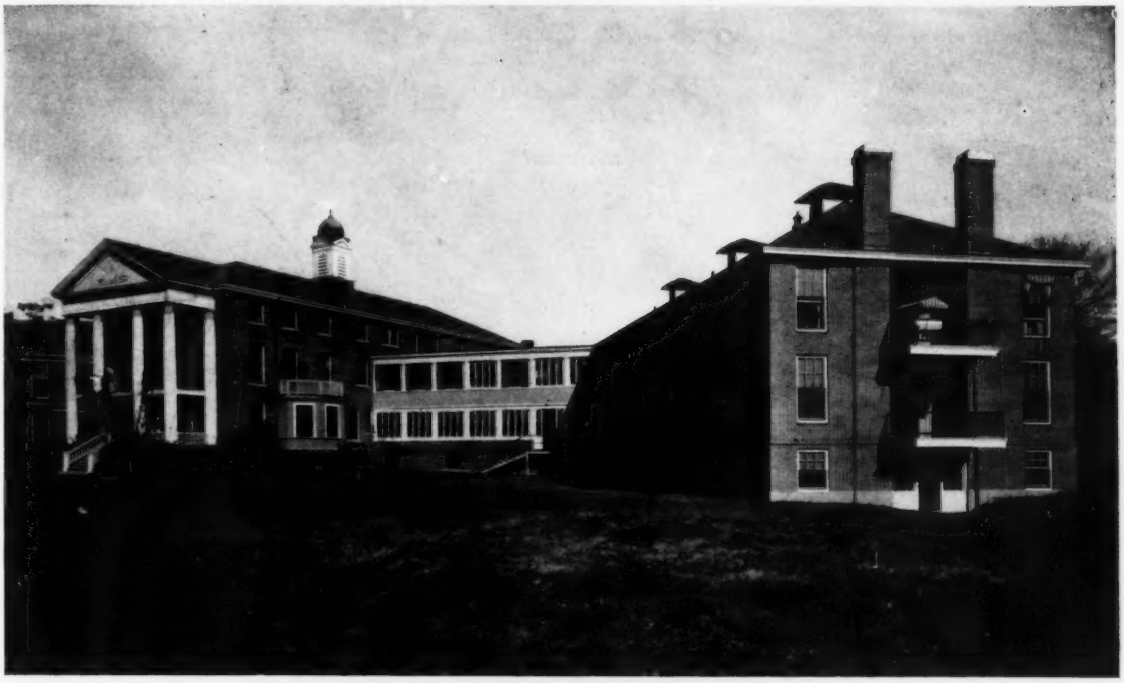
BASEMENT FLOOR PLAN

DETAIL OF ENTRANCE

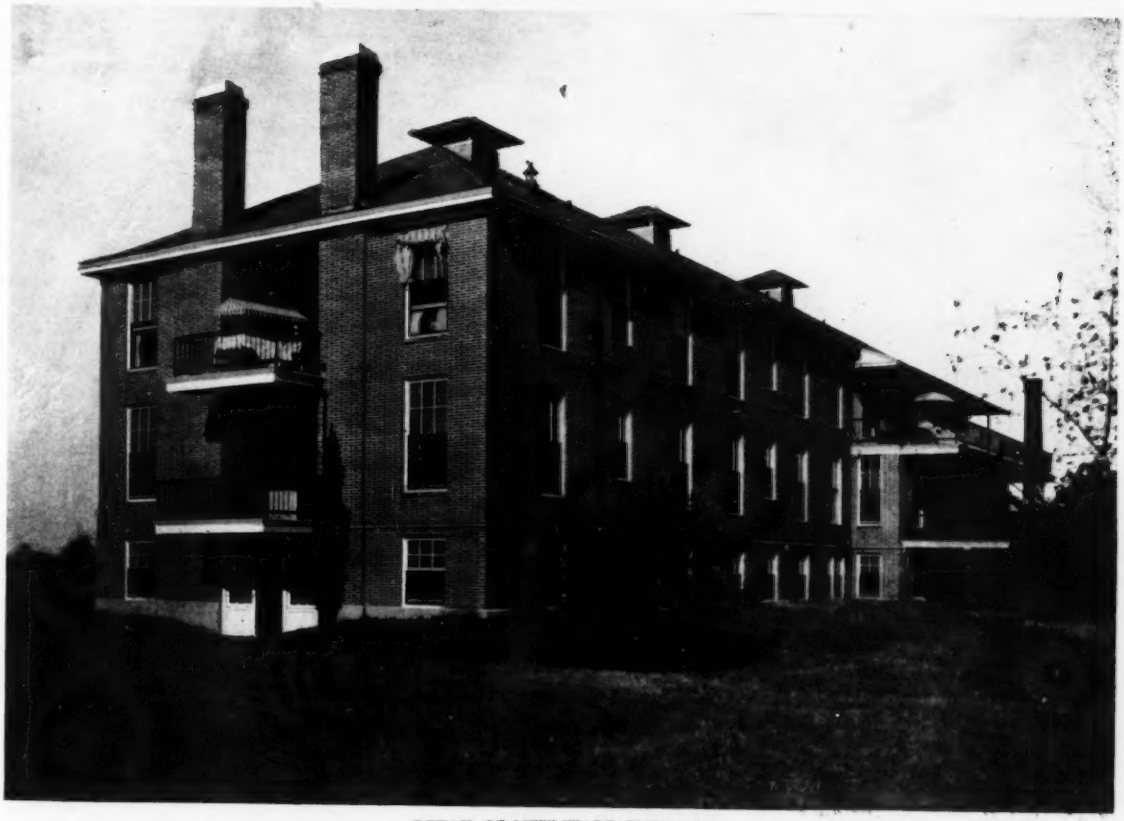
PEKIN PUBLIC HOSPITAL, PEKIN, ILL

HEWITT & EMERSON, ARCHITECTS

Fireproof construction, Built 1917, Cubage 91,206 ft., Cost $40,000, Cost per cu. ft. .438,
18 beds, Cubage per patient 5067 ft., Complete individual building



GENERAL VIEW SHOWING MAIN BUILDING AT THE LEFT



DETAIL OF NEW WARD BUILDING

PRIVATE WARD BUILDING, ADDITIONS TO BEVERLY HOSPITAL, BEVERLY, MASS.

HAVEN & HOYT, ARCHITECTS

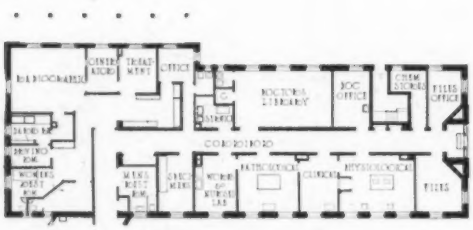
ADDITION TO BEVERLY HOSPITAL
BEVERLY, MASS.

Illustrations on Plate 110

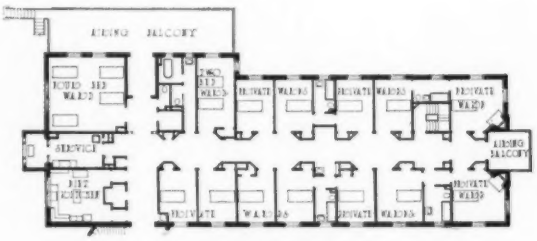
Type of construction. Second class
Exterior walls. Brick
Roofs. Slate
Floors. Wood
Heating. Direct steam
Ventilation. Gravity
Windows. Wood, double-hung
Area of building. 6,200 sq. ft.
Cubage of building (including connecting corridor to administration building). 232,931 cu. ft.
Date of general contract. April, 1921
Cost of building proper. $101,675
Cost per cu. ft. 43½¢
Number of beds. 40
Cubic ft. per patient. 5,823
Cost of operating per day per bed. $6.34

This is a private ward building, part of a hospital already in operation. Laundry, kitchen and power plant service from existing buildings. Special features of the plan are the stepped airing balconies and the splayed door jambs giving a reduction in corridor space.

SECOND FLOOR PLAN

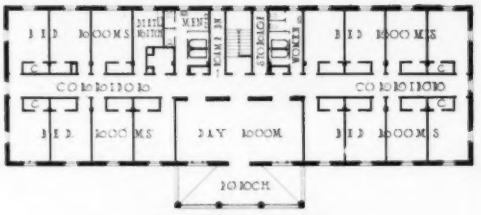


BASEMENT FLOOR PLAN



FIRST FLOOR PLAN

GENERAL EXTERIOR VIEW



SECOND FLOOR PLAN

FIRST FLOOR PLAN

BASEMENT FLOOR PLAN

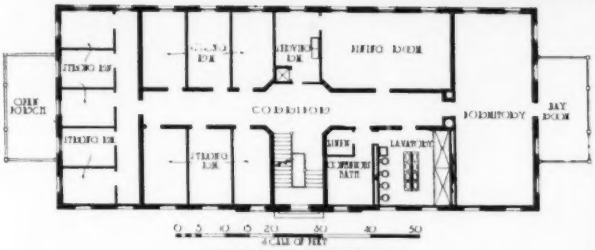
DETAIL OF PORTICO

HOSPITAL, SOLDIERS AND SAILORS HOME, MILFORD, NEB.

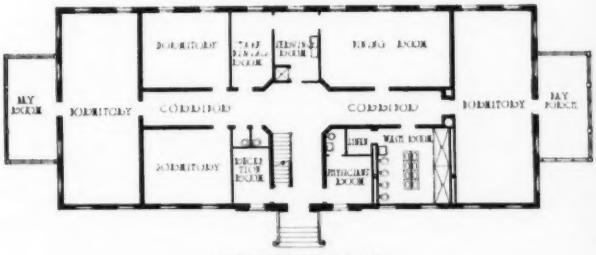
DAVIS & WILSON, ARCHITECTS

Fireproof construction, Built 1921, Cubage 214,228 ft., Cost $80,897, Cost per cu. ft. .37¾,
60 beds, Cubage per patient 3570 ft., Operated as part of large plant

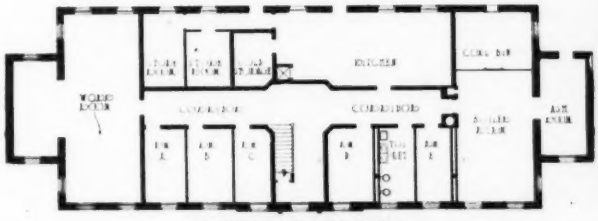
GENERAL EXTERIOR VIEW



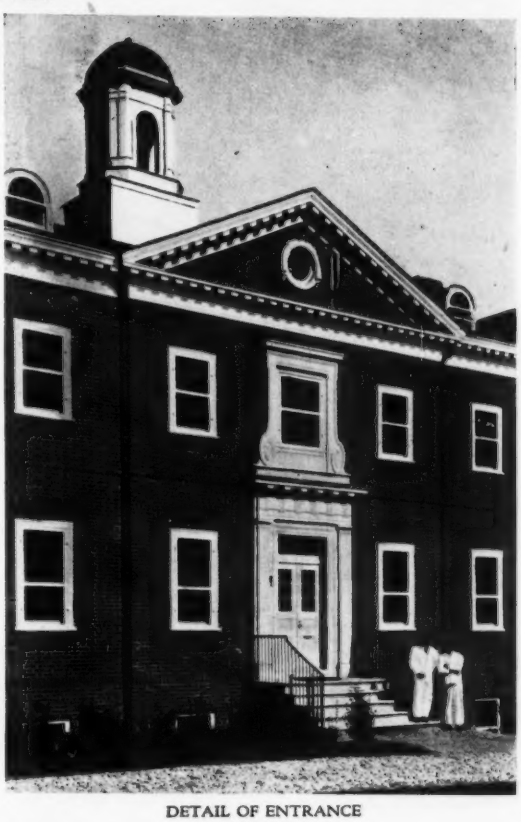
SECOND FLOOR PLAN



FIRST FLOOR PLAN



BASEMENT FLOOR PLAN



DETAIL OF ENTRANCE

PSYCHOPATHIC HOSPITAL FOR CRIMINALS, SPRING GROVE, MD.

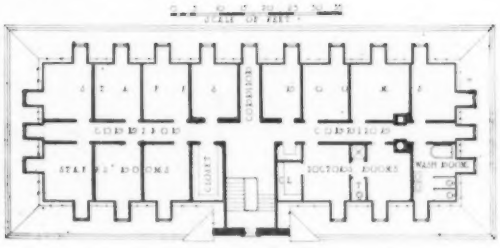
HENRY P. HOPKINS, ARCHITECT

PSYCHOPATHIC HOSPITAL FOR CRIMINALS
SPRING GROVE, MD.

Illustrations on Plate 112

Type of construction. Semi-fireproof
Exterior walls. Brick
Roofs. Slate
Floors. Concrete, hardened surface
Heating. Vapor, steam
Ventilation. Gravity
Windows. Wood, double-hung
Area of building. 4,116 sq. ft.
Cubage of building. 172,872 cu. ft.
Date of general contract. June, 1921
Cost of building proper. $90,000
Cost per cu. ft. 51¢
Number of beds. 90
Cubic ft. per patient. 1,921

This construction includes kitchen and boiler room. Laundry provided by outside service.

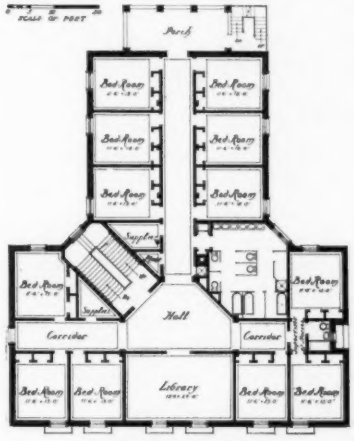


THIRD FLOOR PLAN

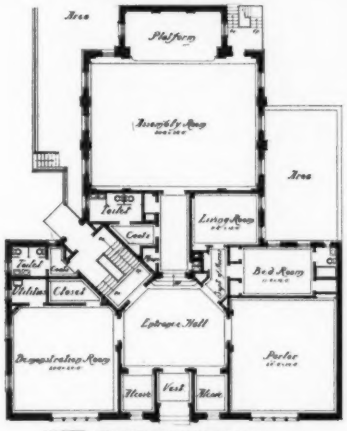
Nurses' Home, St. John's Hospital, Long Island City, N.Y.

ROBERT J. REILY, ARCHITECT

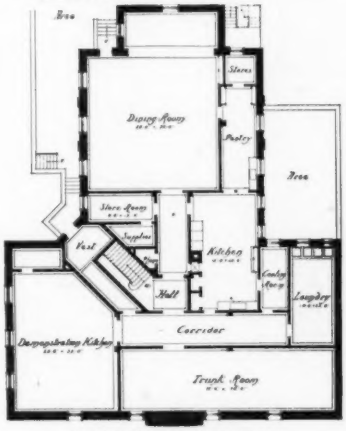
PUBLIC departments are well separated from nurses' quarters. The assembly room seats 200; the building accommodates 75 nurses. Cost $142,420, or 42.4 cts. per cu. ft. Built in 1921.



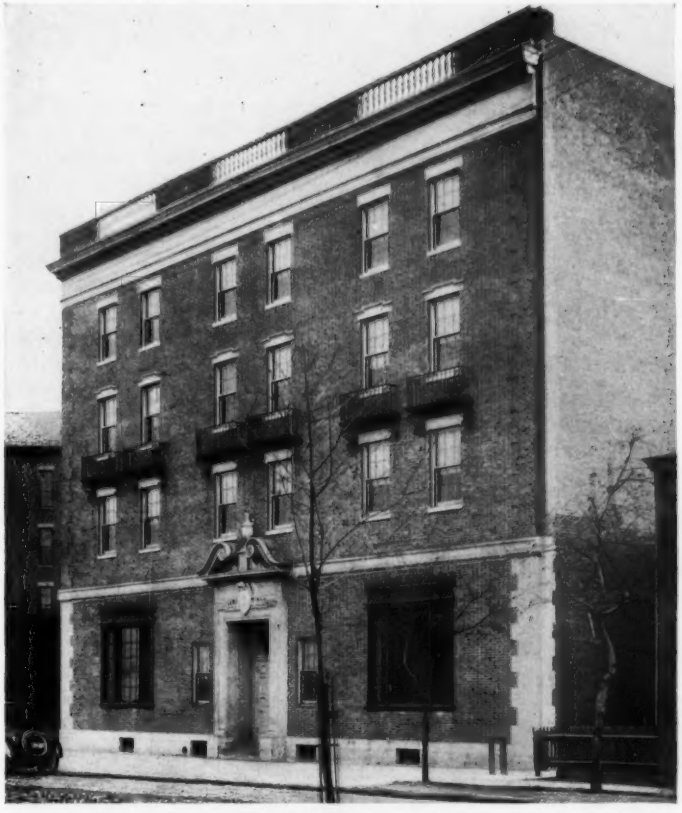
SECOND FLOOR PLAN



FIRST FLOOR PLAN



BASEMENT FLOOR PLAN



GENERAL VIEW OF FACADE

DETAIL OF ENTRANCE

Planning the Small Community Hospital

By CARL A. ERIKSON
of Richard E. Schmidt, Garden & Martin, Architects, Chicago

DEFINITIONS are not a delightful introduction. They are dry and uninteresting and, unlike a dictionary definition, they are without the lure of discovery which lies within Webster's Unabridged. At the risk of starting off on the wrong foot it seems desirable to explain the limits of this article.

"Planning" is used advisedly, as it is not intended to discuss the detailed requirements of each department, nor of hospitals in general. "Small" is a purely relative term in this case, indicating hospitals of less than 25 beds. The "community" may be represented by a village, town or other self-contained group of people, or it may be a suburban village dependent on a larger city. The hospital will be "general," one of the type accepting cases which would fall within the province of the larger "general" hospital. A hospital may best be defined by its purpose which is "care of the sick and injured; to provide training for nurses, dietitians, administrative officers, laboratory technicians, and internes; to encourage and support research in medicine and to prevent illness." This is the goal. If the hospital of less than 25 beds falls short, it is not only because of the limitations inherent in its size, but because of financial limitations as well.

The importance of the topic needs only a few statistics. There are 4,307 hospitals of under 40 beds (probably 3,000 of these are under 25 beds), and only 1,388 of more than 100 beds. There are 2,474 hospitals in cities of less than 10,000 population.

There is a quite evident relationship between the economic and social status of an individual as a member of the community and his quarters as a patient. If the hospital is "of, by and for the people" it must serve both the banker and the baker. Low priced or free accommodations must be paralleled by quarters for those who can pay well, but caste lines are not as rigid as in the larger cities. While the baker might not be comfortable in a bed alongside the banker, both seem to do quite well in adjoining rooms. The number of beds for each class will, of course, vary in each community.

The medical phases of the care of the patient also affect the character of the patient's quarters in important ways. Accustomed as we are to the specialists' standing guard over their sector of our anatomy, it is somewhat of a shock to remember that the "family doctor" is still practicing. He not only brings a boy into the world, but during the subsequent years cares for him in whooping cough, measles, pneumonia and scarlet fever, probably removes his adenoids and tonsils and, perhaps, his appendix. The small community hospital must provide for all of the specialties of a Bellevue or a Cook County, but the "family doctor" practices in all of them! The orthopedic ward of yesterday is the pediatric ward of today, and the obstetric ward of tomorrow. The ward remains the same but, like the chameleon, it changes its color to suit each occupant.

Theoretically at least, the small hospital need only recognize the division of sex. Under it only two wards would be necessary,—one for each sex, together with the necessary quiet rooms. The success of such an arrangement from the medical viewpoint would be entirely dependent on the quality of the nurses and their supervision, both of which are more likely to be uncertain in the small hospital than in the large. Another consideration, however, must be borne in mind—the lessened demand for obstetric and medical beds in a small community, often consisting of one-family houses. As a result, the hospital of under 25 beds is predominantly surgical.

The medical and economic factors point strongly to the single room for each patient. A few of these should be large enough for two beds and used as wards. It is doubtful whether anything larger than a four-bed ward should be considered. The size of the room and its equipment differ little from those of the larger hospital. One room with toilet adjacent should be arranged so that it may be entirely isolated, for even though no known contagious cases are admitted, they will develop in the community hospital and, unlike hospitals in larger places, there is usually no contagious hospital on which to unload the troublesome patient.

The grouping of the patients' rooms or wards should be determined largely by the size of the nursing unit. In a hospital conducting a training school the size is dependent on the capacity of a supervising (graduate) nurse to assist, instruct and supervise her pupils. With no more than 25 beds one nursing center is sufficient—and obviously all on one floor. The multi-storied buildings used for some of the smaller hospitals are much more difficult to "nurse" properly. Whether a hospital of 25 beds or under should attempt to maintain a training school has been the subject of considerable discussion. Where graduate nurses are used exclusively, many more patients may be properly supervised by one "head." In one such case the nursing of 70 patients is adequately supervised from one point. The accessories of the "nursing unit" do not differ markedly from those of the usual hospital unit,—toilets, bathrooms, utility rooms, linen room, nurses' station and serving pantry.

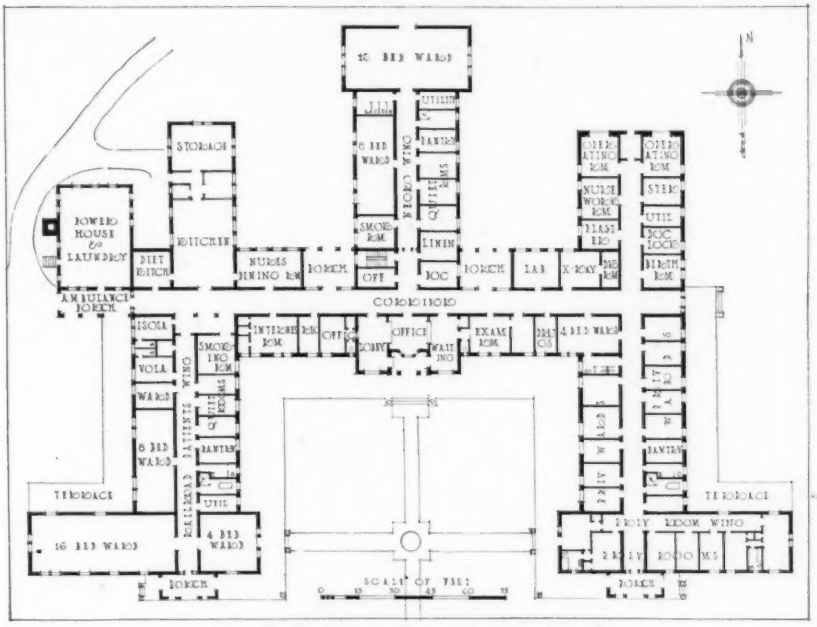
Like every department, the culinary must be reduced to its simplest elements. There are few hospitals with under 25 beds having a dietitian.

Trays will usually be set up in the kitchen and dispatched directly to the patients. Pupil nurses will be taught cooking either in the patients' pantry or in the kitchen itself. Scientific dietetics, unfortunately, will be largely a matter of textbooks. The nurses' dining room will be served directly from the kitchen. The help will eat in the kitchen or, at best, in a small room immediately adjoining. The kitchen itself will be little more than a large domestic kitchen. There must, of course, be ample room for setting up trays, preparing salads, and for the tray dispatch by whatever means be adopted. There can be little excuse for rehandling; sending food in bulk to ward pantry and hot tables, and then redistributing it. The food problem, so difficult and distressing in large hospitals, is relatively simple here, and yet it must be remembered that it is of prime importance that hot, palatable food be served the patient. A central location for the kitchen is essential, but the architect must remember that a convenient and "rapid" kitchen is not a god-given heritage of the small hospital; only by the sweat of his brow will this be attained. And why should the kitchen be carefully tucked away among the pipes in the basement? It isn't economy in building, nor does it mean economy of operation. If this isn't desirable in the house, why in the hospital?

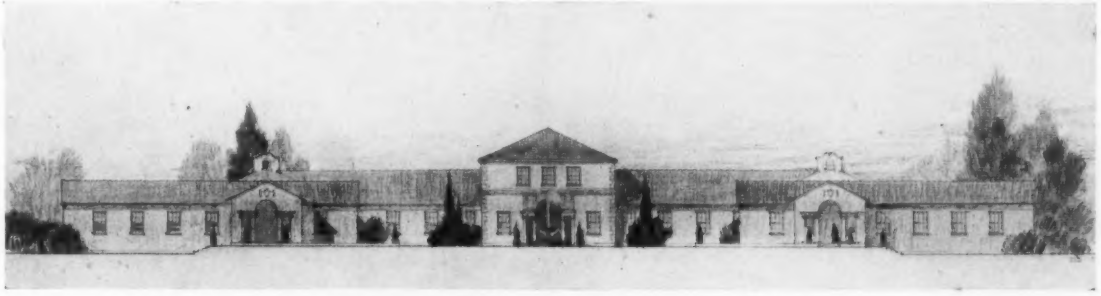
The laundry, even for 25 beds, is relatively simple. A washer, flat-work ironer, a few ironing boards, a three-part wash tub and a dry room are sufficient. If a linen chute is installed, the laundry should be at the base of the chute.

The boiler room and mechanical equipment present no problems. Low pressure or hot water heating is obviously desirable. There is no need for pressure cooking apparatus, and sterilizing as well as laundry should be by gas or electricity. The hot water heater might be of the garbage burner type. It would be better if this and the laundry were placed in a separate building near the hospital. The added expense of both installation and operation is an important element in a decision.

The large hospital has no monopoly on maintenance expense, and it is quite important to make all pipes accessible for inspection and repairs. This is especially true of soil and waste, hot water and steam return lines. The materials of any concealed pipes should be of the very best. The feature of the entire mechanical installation should be simplicity. Every item should be examined with regard to its probable necessity for repair and its ease of repair or replacement. A contrivance that cannot be repaired by the janitor should be given another inspection. If upon further inspection it is necessary to get an "expert" from the factory



Plan of a Single Story Hospital for a Southern City



Elevation of Single Story Hospital for a Southern City
Richard E. Schmidt, Garden & Martin, Architects

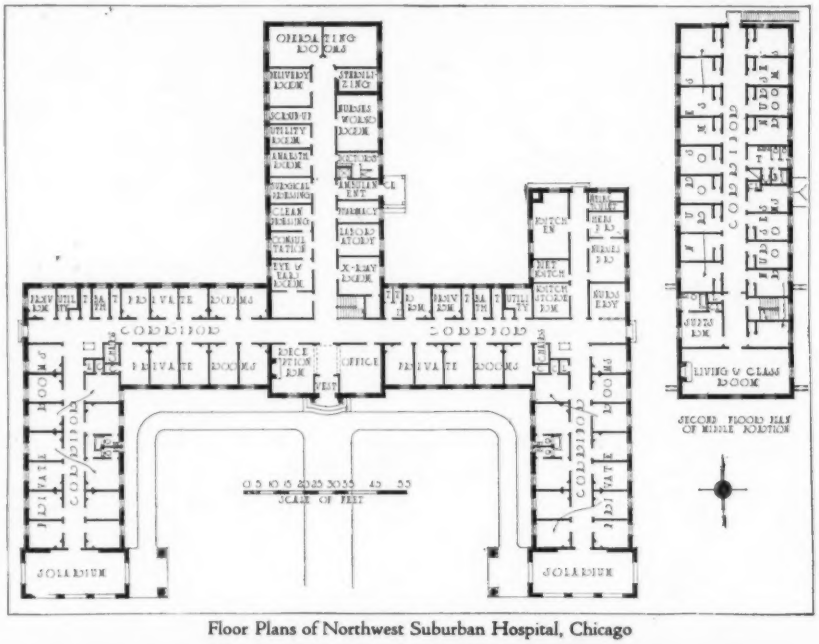
to do the tinkering, avoid it as one does the plague.

The administrative quarters are necessarily rigidly limited,—a general office for a clerk and a small switchboard, a superintendent's office and a record room. A place for the doctors to hang their coats and a small public lobby or reception room would complete this section. A hospital of 10 beds would have but one operating room with an adjacent supply room and doctors' locker room. This would act as an operating room for all of the 40 specialties for both "pus" and "clean" cases, as the birth room, and as a surgical dressing room. The hospital of 25 beds could use comfortably one additional operating-dressing room and larger workroom. The small hospital should be prepared to do all the scientific and diagnostic work of the large hospital. Actually, the limitations of purse and personnel result in the installation of an X-ray department and a pathological laboratory, for without these the hospital is a mere boarding house.

The laboratory and X-ray department had best be close to but not in the operating department, thereby grouping the technical departments. The character of the medical staff and the existing facilities of the community are important elements in determining the sizes of these departments. The community that does not need a hospital larger than 25 beds is usually lacking in properly equipped and staffed private X-ray departments and laboratories. These the hospital must provide. The minimum space requirements are about 200 square feet for each, with a dark room adjacent to the X-ray room.

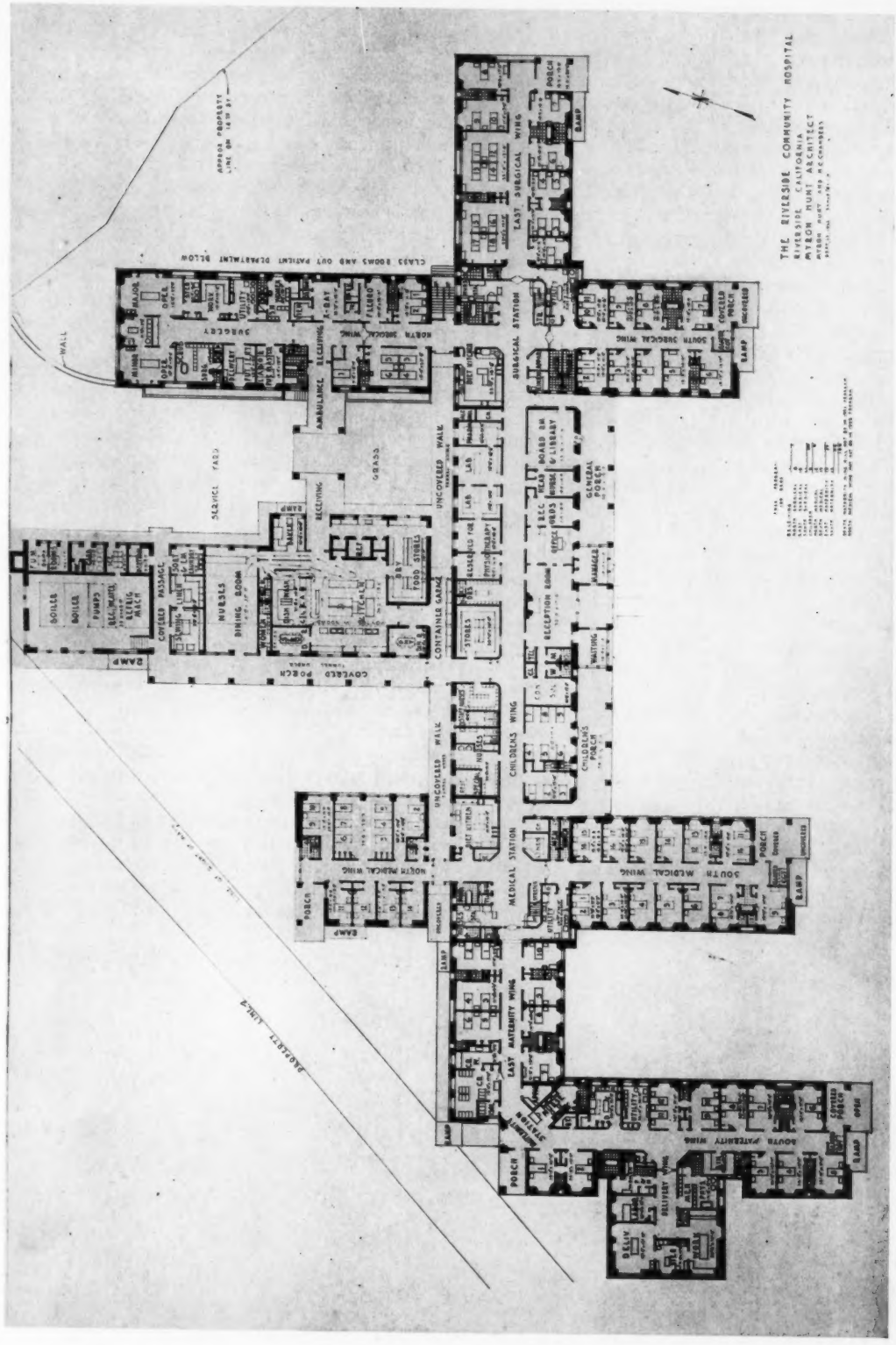
The pharmacy is a relatively unimportant part of the small hospitals. One of the graduate nurses may act as pharmacist, or a local druggist may come in every morning and put up the prescriptions, or else all compounding may be done at the local drug store. In the latter event a large closet only will be necessary. Much scientific apparatus (all of which takes space) will probably be omitted, because the apparatus is valueless unless there is a staff trained to operate it and to interpret the results.

An out-patient department would at most consist of one or two examination rooms. Their inclusion in the hospital is likely to raise a storm of protest by the doctors of the community, and should be suggested only after prayer and penance. If the physicians of the community can be induced to agree to the plan, it would be very desirable to provide offices for them in the hospital. They would, of course, be rented. Such an arrangement would affect the planning in many ways. X-ray room and laboratory should be accessible to the doctors' offices. Probably the size of the operating department should be increased to permit of more minor operations. Such an arrangement would undoubtedly redound to the advantage of the community, the



Floor Plans of Northwest Suburban Hospital, Chicago

Perspective of Northwest Suburban Hospital, Chicago
Richard E. Schmidt, Garden & Martin, Architects



THE RIVERSIDE COMMUNITY HOSPITAL, RIVERSIDE, CALIF.
MYRON HUNT AND H. C. CHAMBERS, ARCHITECTS

hospital and the doctors. To the community and the hospital because of the higher standards of work which would result, and to the doctors because more work would result from the better work done.

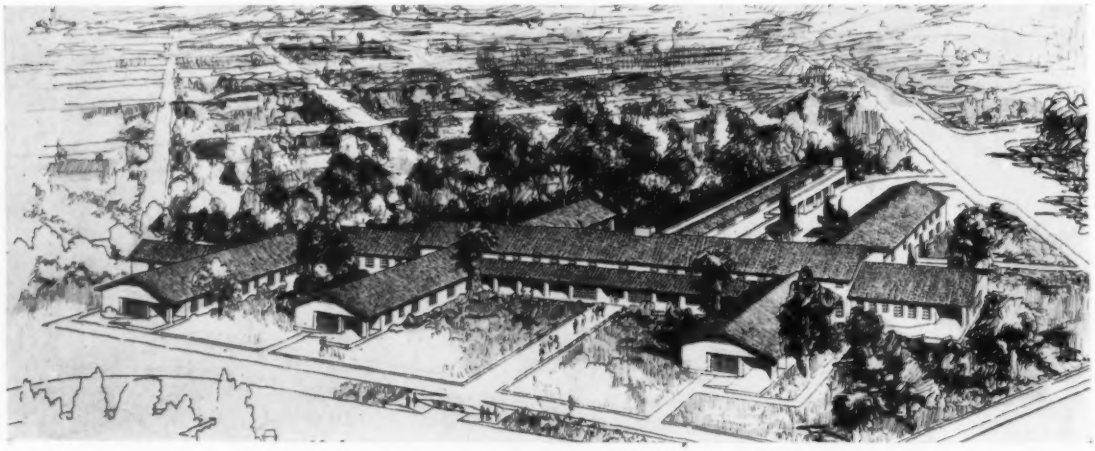
The ideal set by the hospital should include there being a resident physician or an interne. For the hospital of 25 beds or under this is more ideal than practical. Internes are not to be had, and a paid resident is almost as difficult to obtain. The duties ordinarily assigned to the internes will usually be done by the attending men assisted by nurses. It is necessary, however, that someone competent to make decisions and take action in an emergency live in the hospital. This is usually the superintendent.

It may be desirable to provide rooms for the janitor in the hospital, but it is doubtful practice to house any other employes in the hospital. Nurses and help should wherever possible be housed in buildings other than the hospital. While specially designed buildings are desirable, a commodious old house will often make an attractive nurses' home without much alteration. There must be some provision, either in the hospital or in the nurses' home, for graduate nurses on special duty with private patients. Some of these will come from distant points. In addition to the usual locker and toilet room facilities it may be necessary to provide some sleeping quarters.

The one-story hospital is undoubtedly the best for any hospital up to 25 beds. It is more efficient and cheaper in construction and maintenance. It is cheaper in construction because it eliminates elevators, stairs or ramps, eliminates duplication of service rooms, such as utility rooms, pantries, toilets and baths, etc.; it is cheaper in maintenance because of their elimination. Fewer nurses can properly care for 25 patients on one floor than would be required for 25 on two floors. It is more efficient (that is, producing better results for the patient) because it permits of better supervision of the nurses, insures speedier attention to the patients' wants, and more nearly adequate service facilities in the nurses' unit. Obviously a one-story building requires more ground than one of several stories, but ground values are usually low in the smaller communities. An important element is the ease with which patients may be brought into the open.

The 90-bed hospital for a Southern city illustrated here was developed rather carefully as a comparison with a two- and a three-story hospital. While other reasons dictated the construction of a multi-storied hospital, careful quantity surveys of both indicated that the one-story building was slightly the cheaper. The margin in favor of the one-story building increases very rapidly as the hospital grows smaller. Mr. Hunt's Riverside Hospital, and the Northwest Suburban Hospital by Schmidt, Garden & Martin indicate the perfect flexibility of the plan, and the ease with which a comprehensive program may be developed piecemeal. An element of constantly increasing importance is the appearance of our hospitals. Any architect will quickly grasp the wonderful possibilities of the one-story hospital.

Too much emphasis cannot be laid on the importance of careful planning, based on a thorough knowledge of the processes involved. The human and monetary waste in poorly arranged and improperly detailed hospitals is enormous, and when it is remembered that this waste goes on day after day and year after year with little prospect of stopping it, and that it is a perpetual drain on the charitable funds of the community, it will be realized how important careful planning is. The benefit to the patients and the community through better and speedier service cannot be measured. Unfortunately, there can be no Moses to bring down the laws from the Mount. There can be no fixed rules as to how these hospitals should be built, for each has its special problem. Therein lies its fascination and danger for the architects who build them.



Bird's-eye Perspective, Riverside Community Hospital, Riverside, Calif.
Myron Hunt and H. C. Chambers, Architects

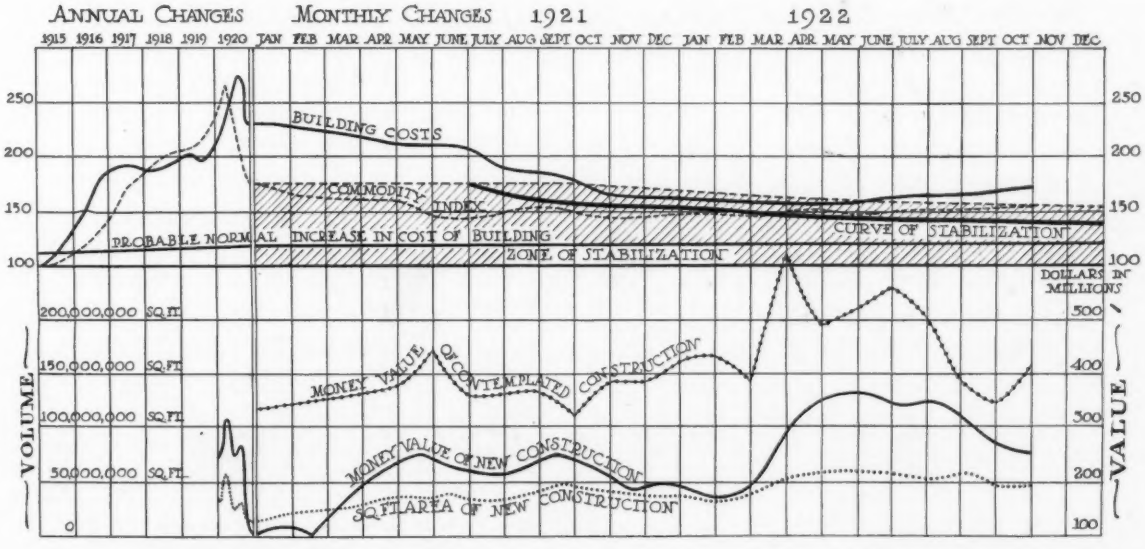
SERVICE SECTION
of THE ARCHITECTURAL FORUM

Information on economic aspects of construction and direct service for architects on subjects allied to building, through members of THE FORUM Consultation Committee

The Building Situation

AS we reach the end of the year 1922 it is gratifying to realize that predictions made by THE ARCHITECTURAL FORUM during the past two or three years as to the excellent position which the architect would enjoy at this time have been more than fulfilled. 1922 has been one of the most satisfactory years which architects have known, because it has been the year of extensive building activity in which the growing recognition of architectural service on the part of the public has been demonstrated. It has been a year of satisfaction also because all evidence during the year indicates that a number of good years will follow.

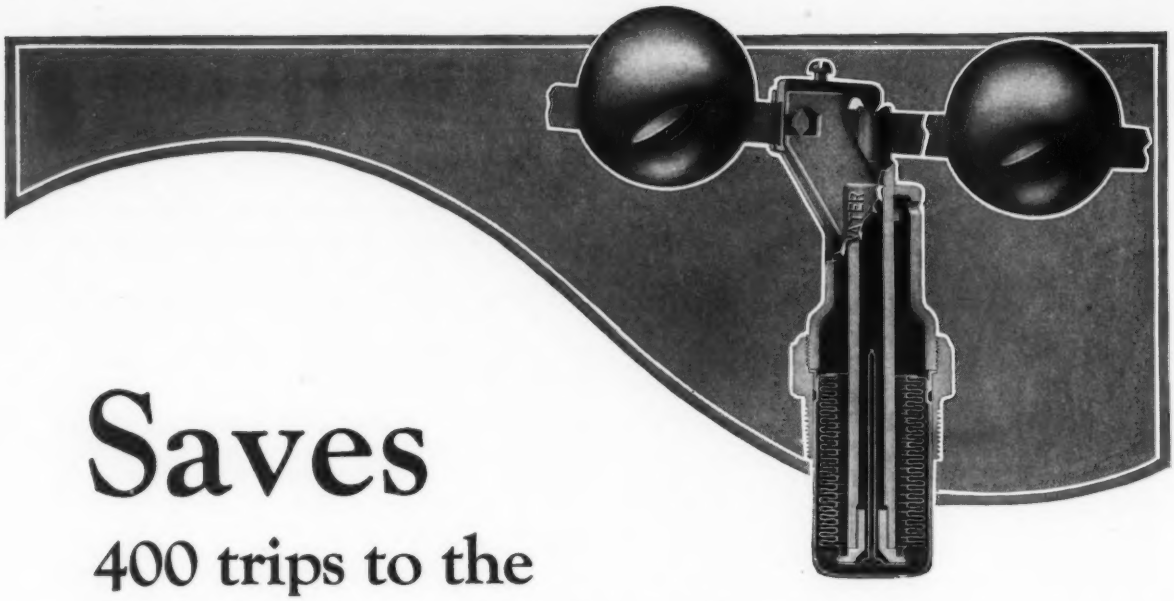
In the survey for 1922 made by THE FORUM in December, 1921, the prediction was made that 1922 would show an investment of over $4,000,000,000 in building construction. Building reports during this year have fully justified this prediction, giving added value to the forecast for 1923. As indicated in the chart below, building costs have recently passed out of the zone of stabilization, and the seasonal decline in contemplated construction and contracts let is augmented by this fact. The reasons for increased costs include not only depletion of building material supplies owing to the great demand for 1922, but include the after-effects of the rail and coal disturbances. We have every reason to believe that manufacturers are increasing production facilities and that, with conditions undisturbed, the supply of materials will be adequate to meet the demand next year, with a return in the cost index at least to the low level of the early summer of 1922. Manufacturers will probably decide with wisdom to take profits on volume, and the labor situation has at least one bright spot in the fact that the production per man in the building field has increased considerably. We therefore look forward to a sound and prosperous year for architects during 1923—a year in which hard work and merit will be surely recognized by an increasingly intelligent public.



THIS chart is presented monthly with trend lines extended to the most recent date of available information. Its purpose is to show actual changes in the cost of building construction and the effect upon new building volume and investment as the *index line of building cost* approaches or recedes from the "curve of stabilization."

The CURVE OF STABILIZATION represents the building cost line at which investors in this field may be expected to build without fear of too great shrinkage in the reproduction value or income value of new buildings. The index line representing actual cost of building entered the ZONE OF STABILIZATION in the fall of 1921. If this cost line passes *out* of the zone of stabilization, building volume will decrease materially.

The degree of the curve of stabilization is based on (a) an analysis of time involved in return to normal conditions after the civil war and that of 1812; (b) the effect of economic control exercised by the Federal Reserve Bank in accelerating this return after the recent war, and (c) an estimate of the probable normal increase in building cost.



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Premiated design will receive	$500.00
Design placed second will receive	300.00
Design placed third will receive	150.00
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The next ten designs will each receive . . .	50.00

Competition closes at noon,
Monday, February 5, 1923

For complete program see the November, December or January issue of Pencil Points, or write to the American Face Brick Association

AMERICAN FACE BRICK ASSOCIATION

1751 PEOPLES LIFE BUILDING · CHICAGO, ILLINOIS

TRUSCON
Waterproofing Paste
CONCENTRATED

Residence of
Philip P. Barber, Esq., Tenafly, N. J.
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New York City

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WHILE the thousands of large buildings scattered through the United States which have been waterproofed with Truscon Waterproofing Paste are the best evidence of the merit of this material—we must not lose sight of the fact that efficient waterproofing is equally desirable for our homes.

In the residence above, the architect has taken care that all the foundation work has been waterproofed with Truscon Waterproofing Paste, *Concentrated.* He thereby relieved himself of any doubt that might have existed in his mind as to the probable water-tightness of the basement.

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It is so very easy and practical to waterproof concrete, stucco and cement plaster that no piece of construction should be undertaken that is not safeguarded against moisture.

Truscon Waterproofing Paste is both economical and simple to use. It lubricates the concrete and enables it to flow easily into the forms without segregation. It cuts the surface tension of the water and makes possible a closer and more uniform amalgamation of the cement and aggregate.

Specifications for waterproofing Mass Concrete, Cement Stucco or general Masonry Surfaces will be gladly sent to any engineer or architect who is interested. Ask for "Science and Practice of Integral Waterproofing".

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The World's Largest Manufacturers of Integral Waterproofings

DETROIT, MICHIGAN

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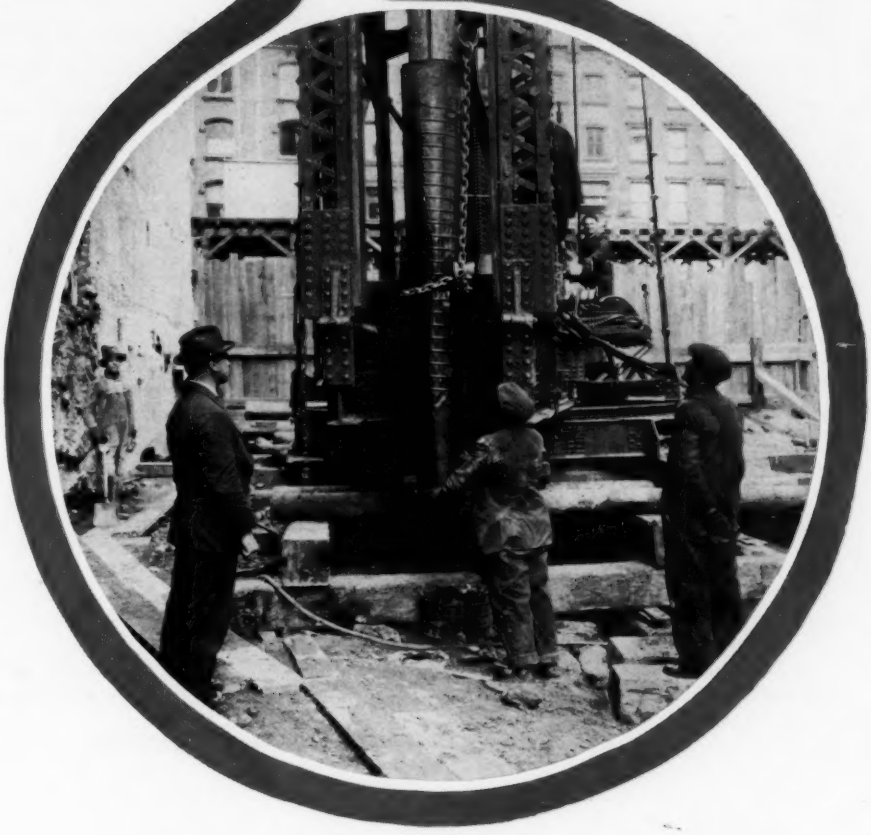

See the point? It's the toe or boot of the long, spirally reinforced steel shell that is driven to serve as a permanent "form" for every Raymond Concrete Pile—the famous Raymond Method

RAYMOND CONCRETE PILE COMPANY

New York: 140 Cedar St. Chicago: 111 W. Monroe St. Montreal, Canada

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"A Form for Every Pile—A Pile for Every Purpose"

A Steel, "Hand Tailored" Boiler

Hydraulic Riveter at work on a Kewanee Boiler

Each and every

Kewanee Boiler is a "hand tailored" boiler. Each boiler is cut out individually, from accurate steel patterns, and each rivet is individually driven with tremendous hydraulic pressure.

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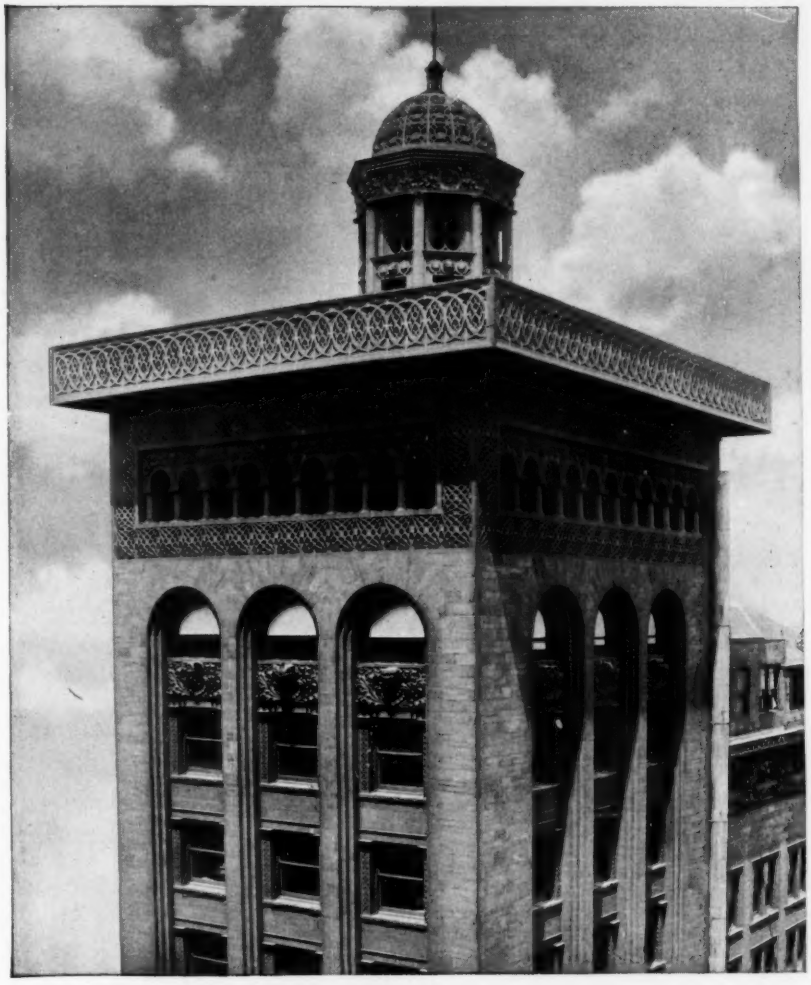

Garrick Theatre (formerly Schiller Theatre) Building, Chicago, Illinois. Adler & Sullivan, Architects. Gray unglazed Terra Cotta throughout. Erected 1891. Photograph taken 1922.

A TEST *of* 31 YEARS

ERECTED in 1891 this building attests the enduring qualities of Terra Cotta under conditions of climatic exposure affording the severest trial. Proper detailing of Terra Cotta and its intelligent relation to other materials will always assure this result.

Note, also, how the size of the individual units of the Terra Cotta is in scale with the general proportions of the building.

Seventy typical plates showing correct detailing for Terra Cotta will be sent on request. Address **National Terra Cotta Society,** 19 West 44th Street, New York, N. Y.

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Permanent *Beautiful* *Profitable*

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Buffalo General Hospital, Buffalo, N. Y.
Lee Memorial, Johnstown, Pa.
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C. & O. Hospital, Richmond, Va.
Union Benevolent Assoc. Hospital, Grand Rapids, Mich.
City Hospital, Indianapolis, Ind.
Parkland Hospital, Dallas, Tex.
St. Joseph Sisters Hospital, Elmira, N. Y.
Hotel Dieu, New Orleans, La.
Levi Memorial Hospital, Hot Springs, Ark.
Tuberculosis Hospital, St. Paul, Minn.
Rockwell Field Hospital, San Diego, Calif.
Sara Leight Hospital, Norfolk, Va.
Good Samaritan Hospital, Lexington, Ky.
Non-Sectarian Infirmary, Mobile, Ala.
W. Penna. Hospital Assoc., Pittsburgh, Pa.
Homeopathic Hospital, Portland, Ore.
Cook County Hospital, Chicago, Ill.
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Sea View Hospital, New York City
Etc., Etc.

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BECAUSE hospitals must be *fireproof*, Truscon Reinforcing Products have been used in innumerable buildings of this character. Because they must be *soundproof*, Truscon engineers have cooperated in securing the right construction for hospitals throughout this country and abroad. Because they must be *permanent*, Truscon Steel Quality Products have made them so.

Daylight is another essential factor in the modern hospital, and for this purpose Truscon Steel Windows furnish the maximum light and ventilation. These windows are made in a variety of types and sizes to harmonize with any architectural treatment or hospital requirements. They are fireproof, attractive in appearance and permanent.

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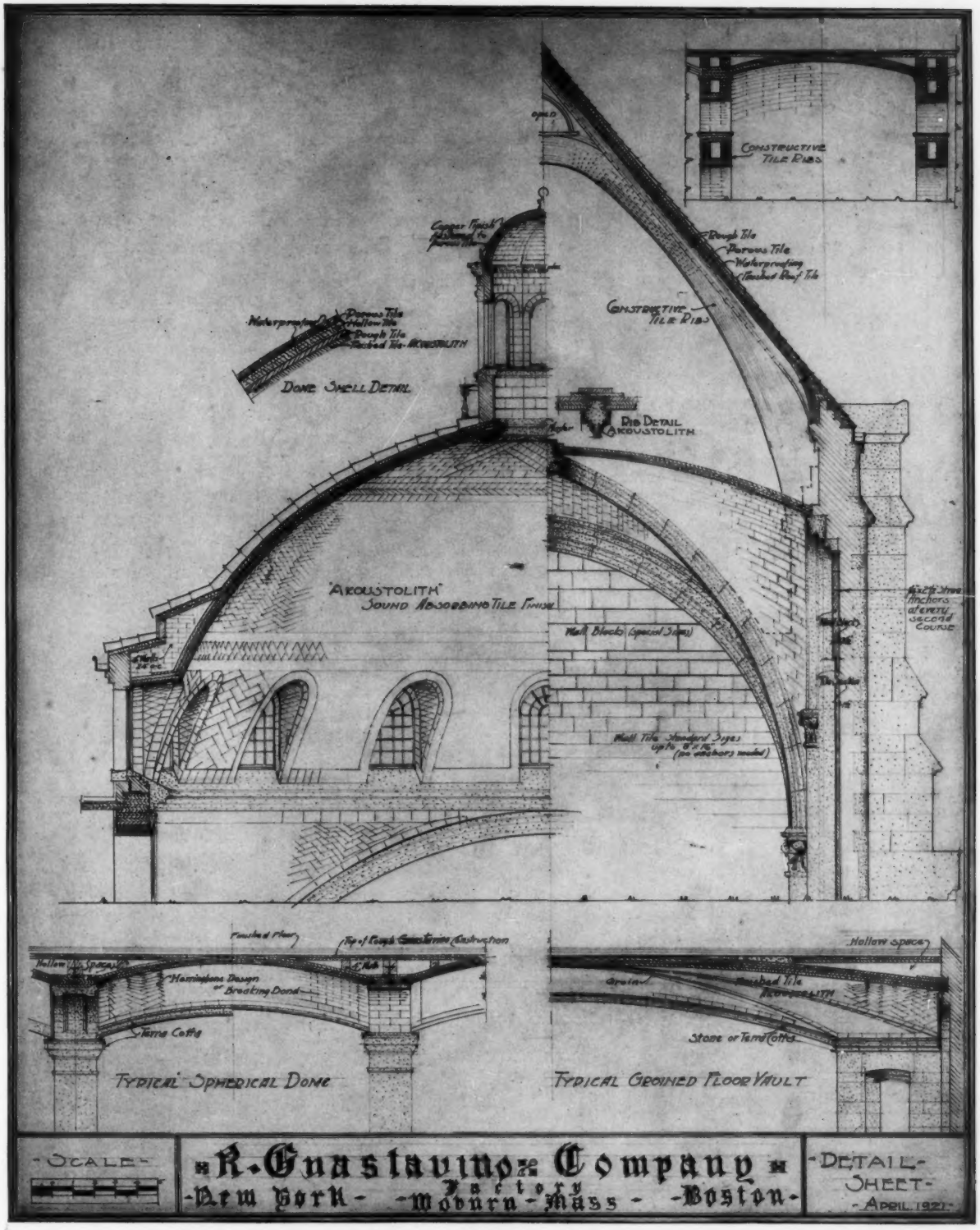
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APRIL 1921

St. Mary's Hospital, Philadelphia, Pa. Ballinger & Perrot, *Architects*
Trimmed with a soft gray shade of Terra Cotta

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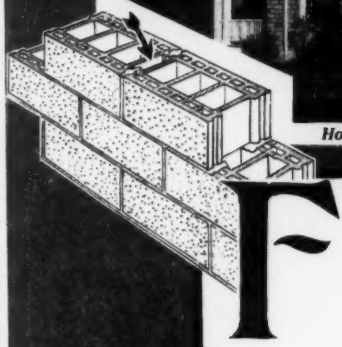

FOR hospitals Natco Double Shell Tex-Tile seems especially well adapted. It is Strong—that has been amply proved. It is Fire-Safe. It represents the maximum of Interior Comfort because the arrangement of the dead air space eliminates through mortar joints making it proof against weather and—particularly—against moisture. It is very easy to maintain an even comfortable temperature within Natco Tex-Tile Walls.

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Natco Bulletin 174 contains detailed drawings prepared especially for the profession. Write for a copy.

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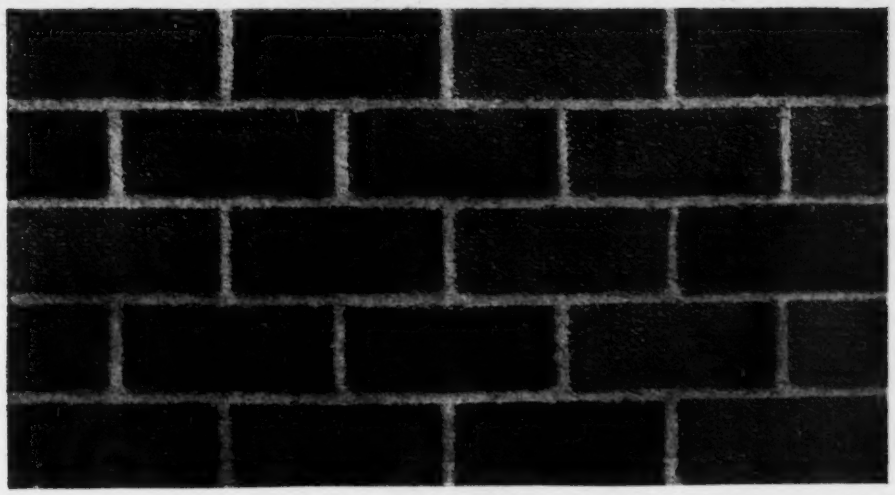

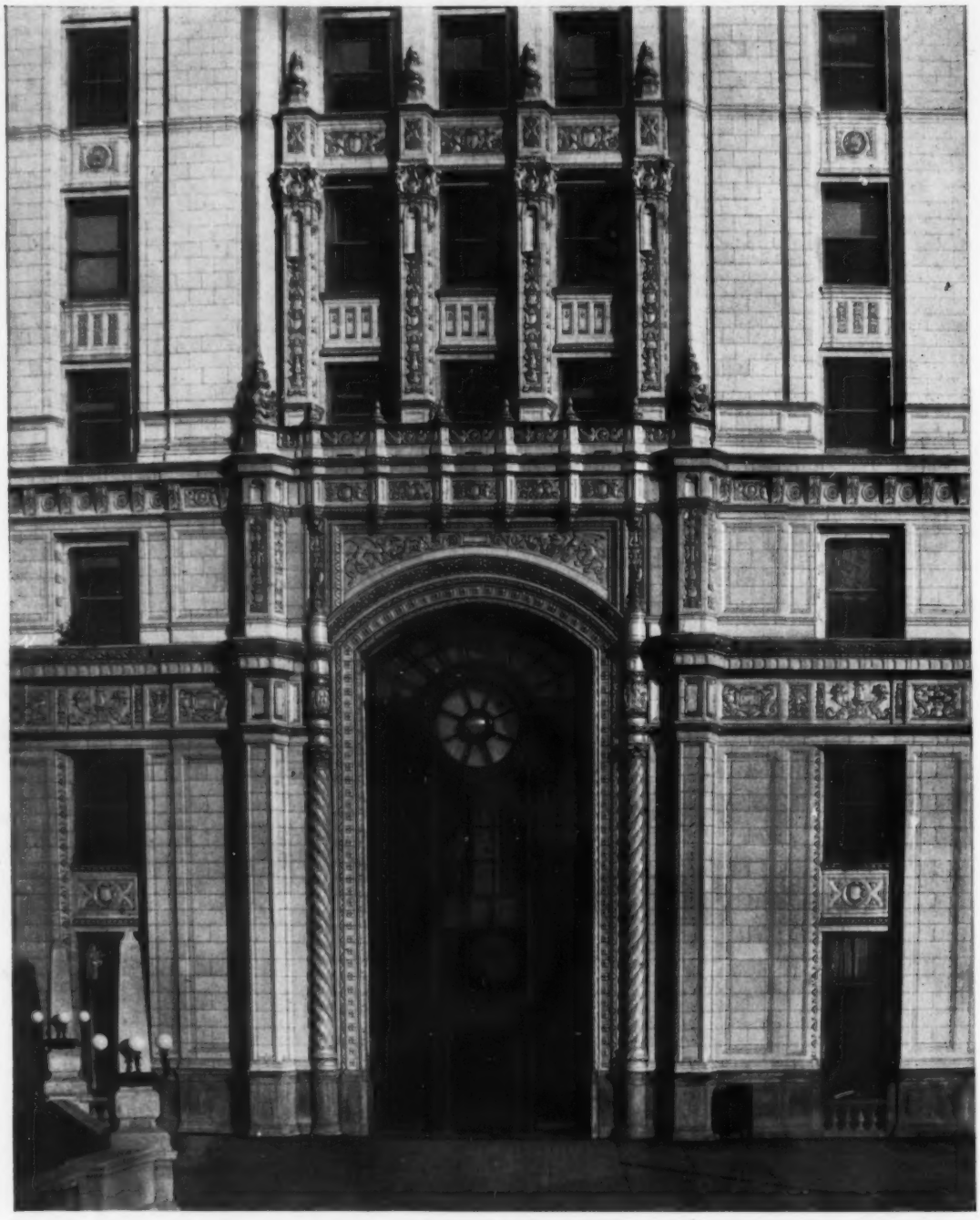

DETAIL of Doorway feature, the Wrigley Building, at the new Michigan Boulevard Bridge, Chicago. Graham, Anderson, Probst & White, Architects. Lanquist & Illsley, Builders. This magnificent building is faced and trimmed on all sides from sidewalk to searchlight, with White Enamel Terra Cotta, manufactured and set by this Company.

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A property of linoleum that recommends it particularly for tuberculosis hospital use is its germicidal character, due to the oxidized linseed oil which forms one of its chief ingredients. Dr. Ludwig Bitter, a German bacteriologist, working in the Hygienic Institute in Kiel, on inlaid linoleum seven years old, found that " . . . virulent typhosus and streptococci or pus formers were killed in eight hours and that all impure micro-organisms brought in by dirty shoes were killed."

"This bactericidal power of linoleum," he concludes, "is due to the fact that acid gases, including formaldehyde and formic acid, strong bactericidal agents, are constantly being given off as a result of the linoxyn formation (*i.e.*, oxidized linseed oil)."

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A-14

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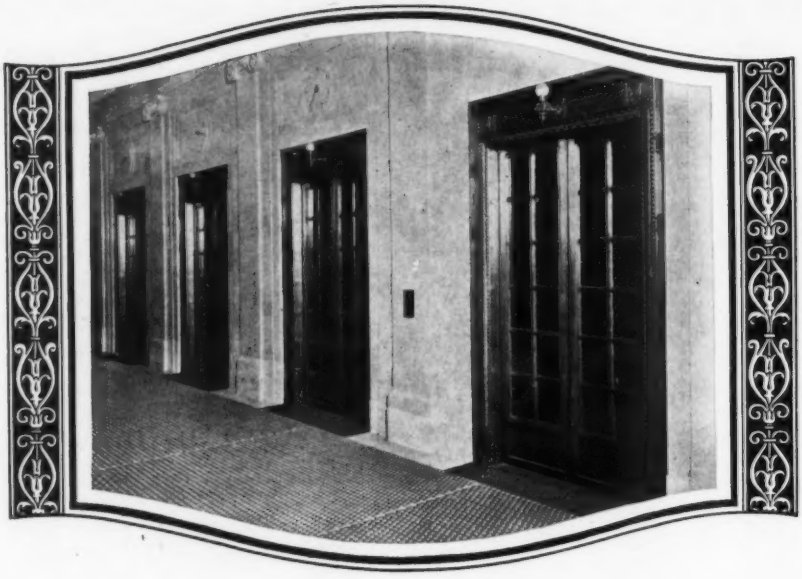

ZONES OF QUIET

Hospital Elevator Car

IN the respectful quiet of a hospital, a clumsy, noisy elevator entrance is particularly conspicuous and annoying. The thoughtful restraint of physicians, nurses and visitors is all in vain if patients are disturbed by the rattling and banging of elevator doors.

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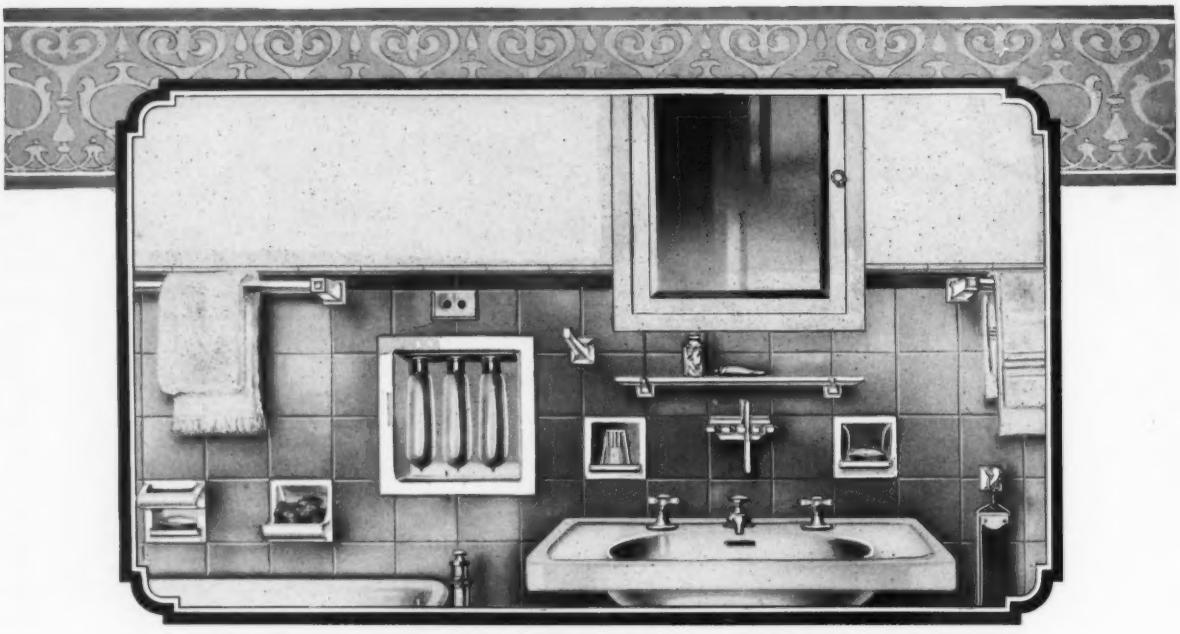
The finishing touch to a PERFECT BATHROOM



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To Architects In the Hospital Field

FLOOR and wall materials for hospitals are required to meet such varied demands of service that their selection is more than an average building problem.

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To find a material admirably adapted to one or two of the requirements listed is an easy task. But hospital floors and walls cannot be installed with only one or two such needs in mind. The material employed must approximate the *sum* of what is wanted.

All the arguments in favor of other materials, whose good features may be limited to a minority of the functions acknowledged as necessary, cannot change the fact that in the aggregate—measured by their total merits and not by individual advantages—Tiles are to be preferred.

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All these form a collective standard of desirability, and are scarcely to be separated into units of advantage in relation to this or that requirement. Their grand average favors Tiles—most decidedly.

This association offers to architects a service of suggestion and specification data designed to accomplish ideal results in hospital construction, with the most economical means. The service is rendered on the broadest ground of co-operative effort.

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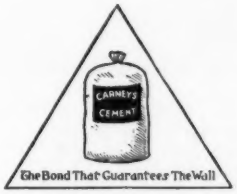

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See Sweet's, Pages 211-214

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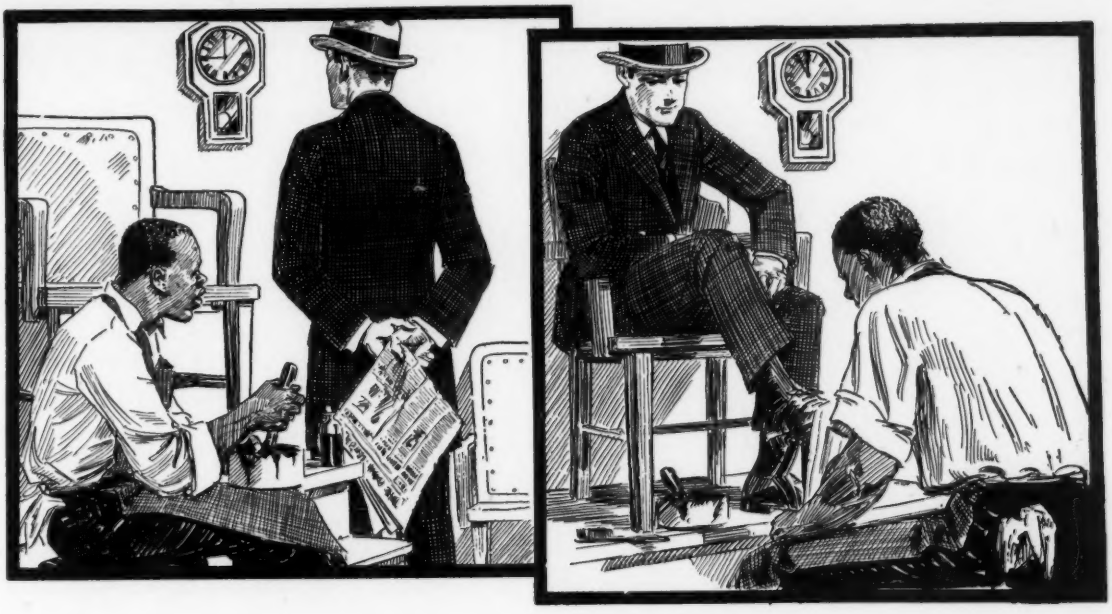
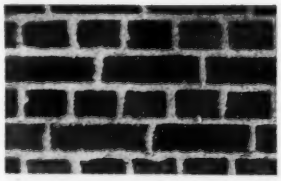
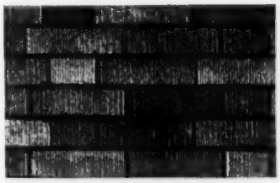


Do you have to wait two hours before your shoe polish can be applied?





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Nonsense! No more inconsistent, however, than to have to prepare your mortar the night before with the attendant risk of bad-weather delays causing your batch to deteriorate.

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No slaking. No mortar beds. One part Brixment with three parts sand and sufficient water for proper consistency gives you a mortar more plastic, more easily worked, with a final strength exceeding that of the brick itself.

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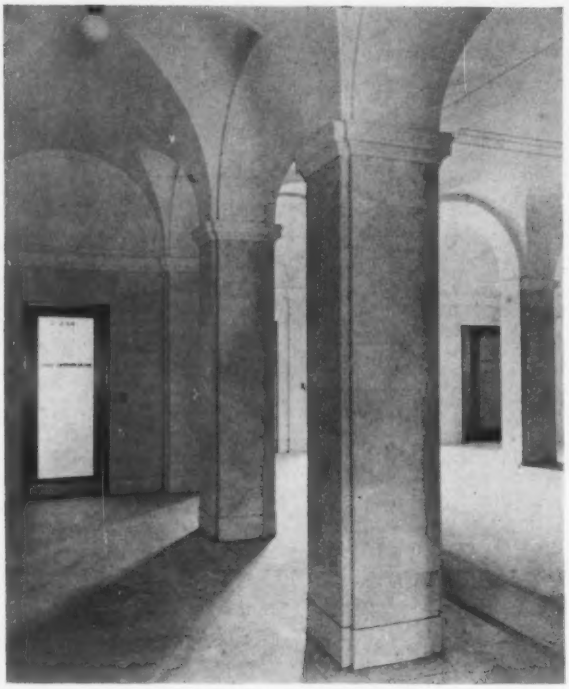

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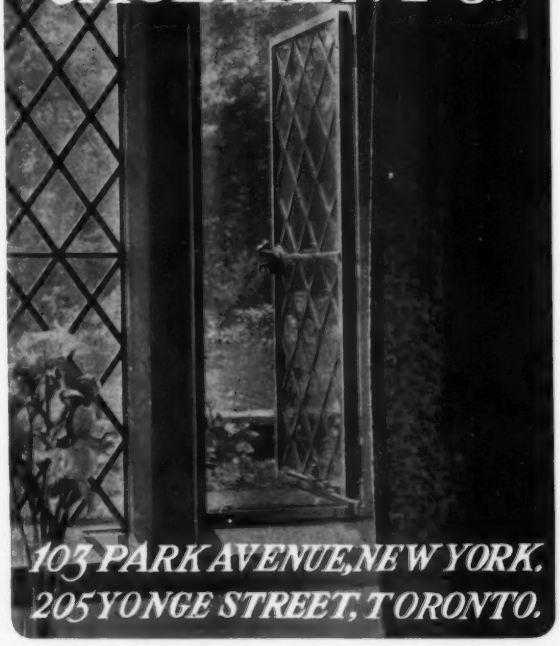

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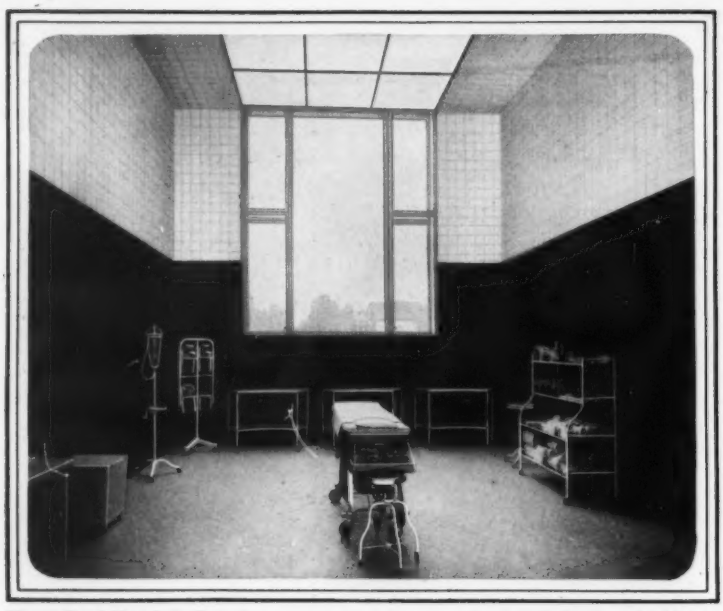

Henry Ford Hospital, Detroit — Stratton & Snyder, Architects

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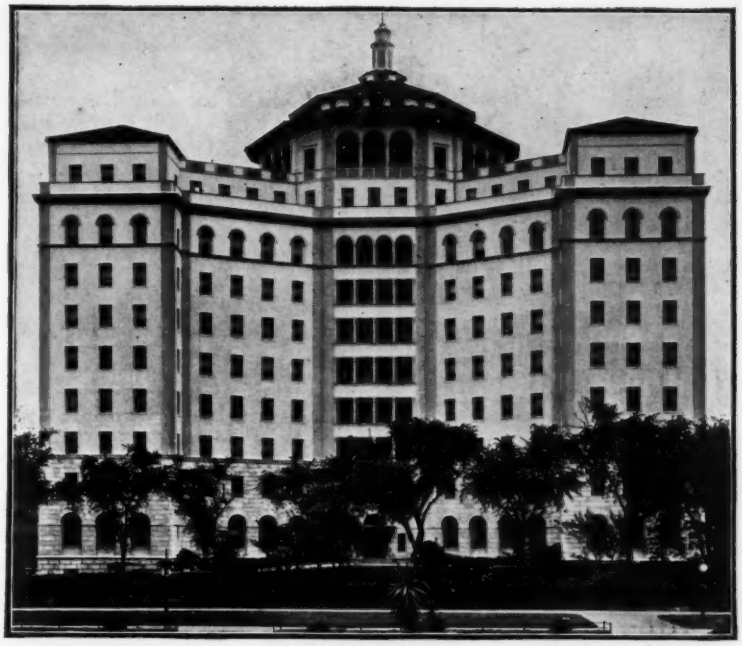

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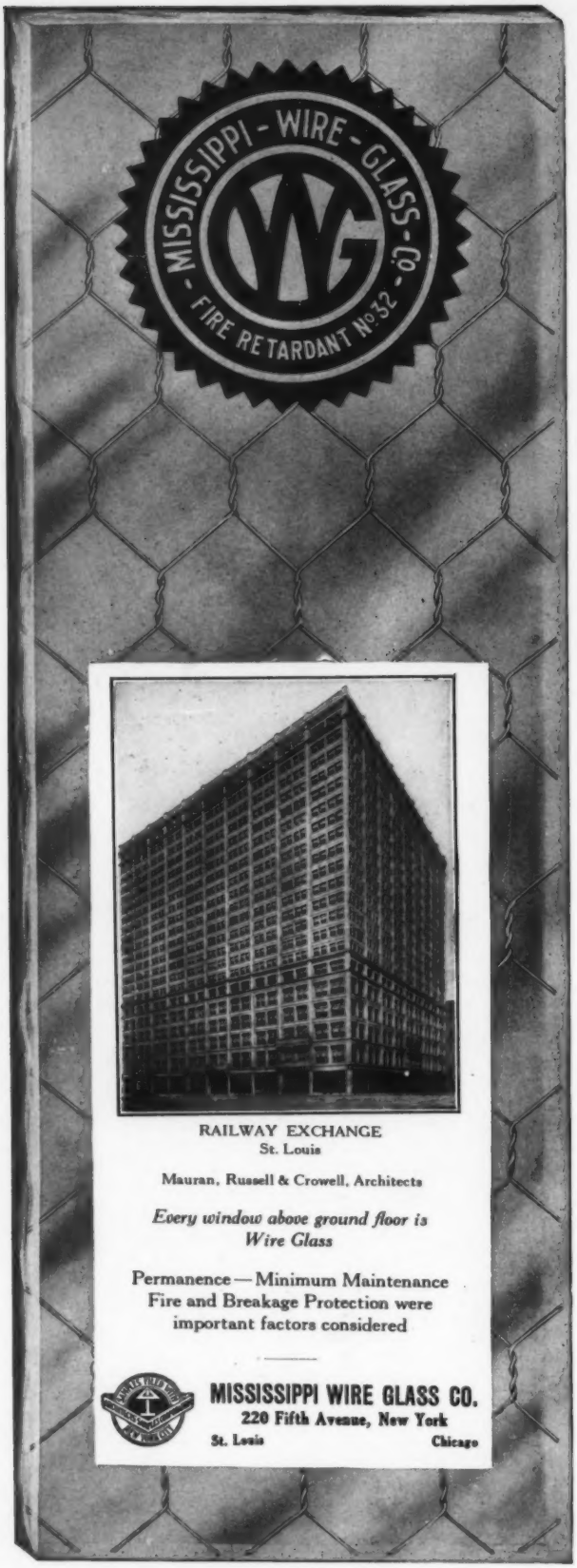

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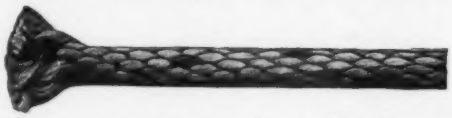

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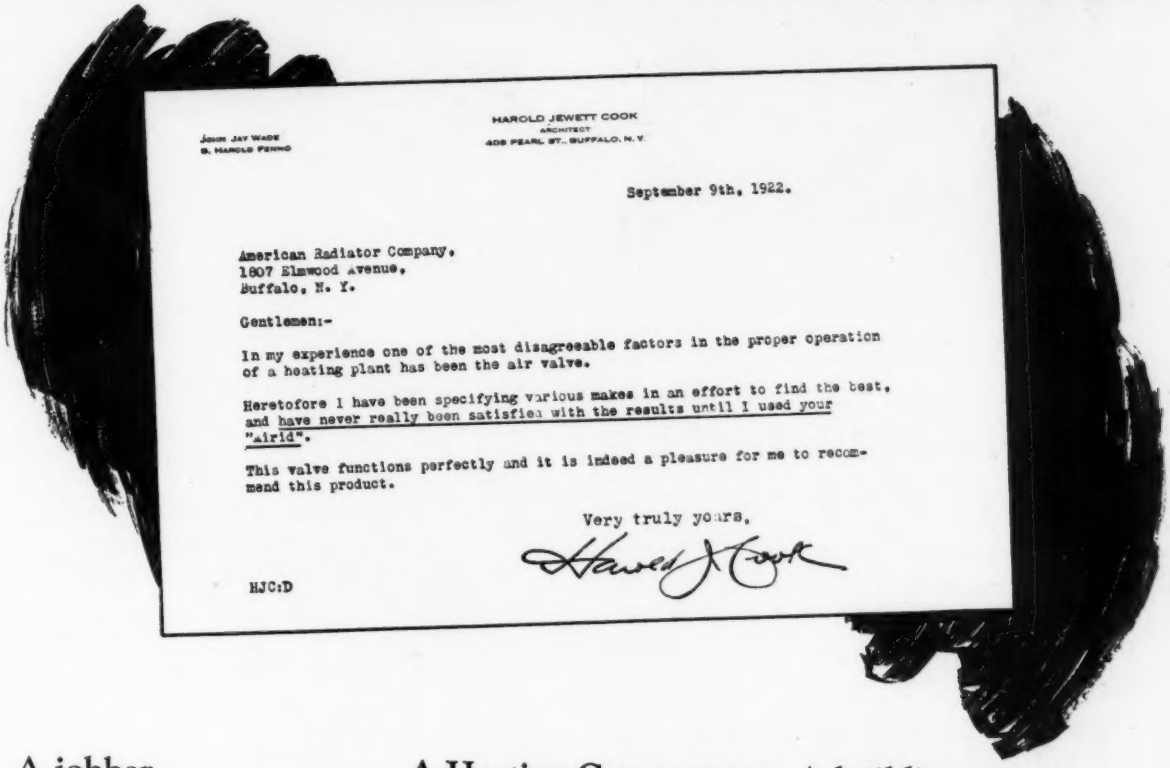

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HAROLD JEWETT COOK
ARCHITECT
405 PEARL ST., BUFFALO, N. Y.

September 9th, 1922.

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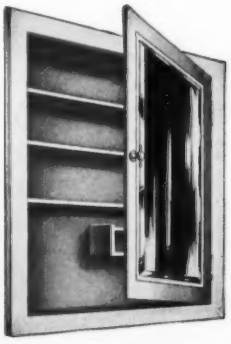

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CONCRETE Floors (with Integral Hardner and Coloring) were recommended as second choice by the Floor Committee of the American Hospital Association for the following hospital services at the Atlantic City Convention: Private Rooms, Wards, Service Rooms, Corridors, Service Corridors, Out-Patient-Treatment Rooms, Out-Patient Corridors, Offices. They were first choice for Laundries and Comparable Services.

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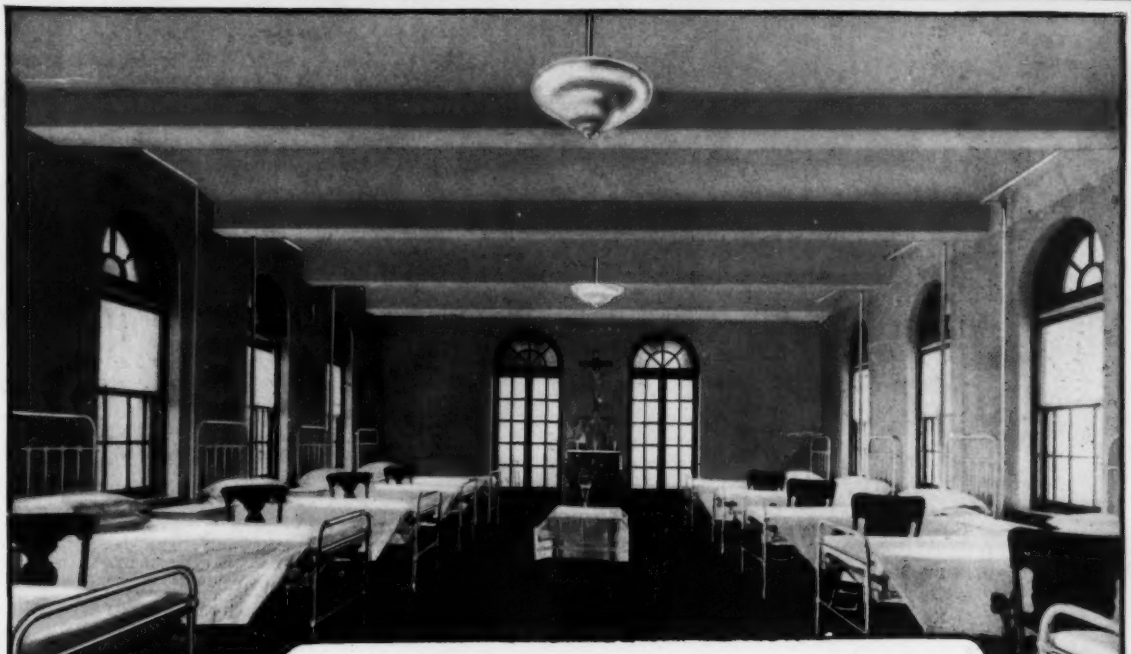

Nairn Plain Linoleum in restful green covers the floors of the House of Calvary Hospital, New York

Mr. Robert J. Reiley, 477 Fifth Avenue, New York, *Architect*

O.K.'d by Hospital Officials

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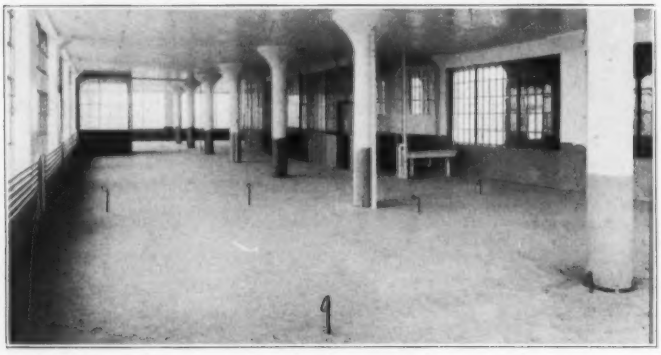
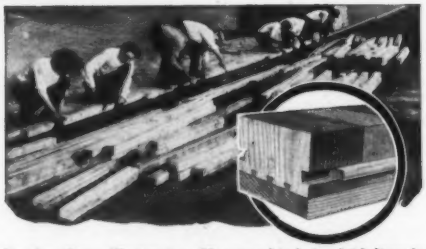
A workroom in the Seymour Vocational School, Newark, N. J. Ely & Ely, Archts.



Bright Clean Durable



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C. Godfrey Pogg	Elizabeth, N. J.
Chas. A. Smith	Kansas City, Mo.
Coffin & Coffin	New York City
Smith & May	Baltimore, Md.
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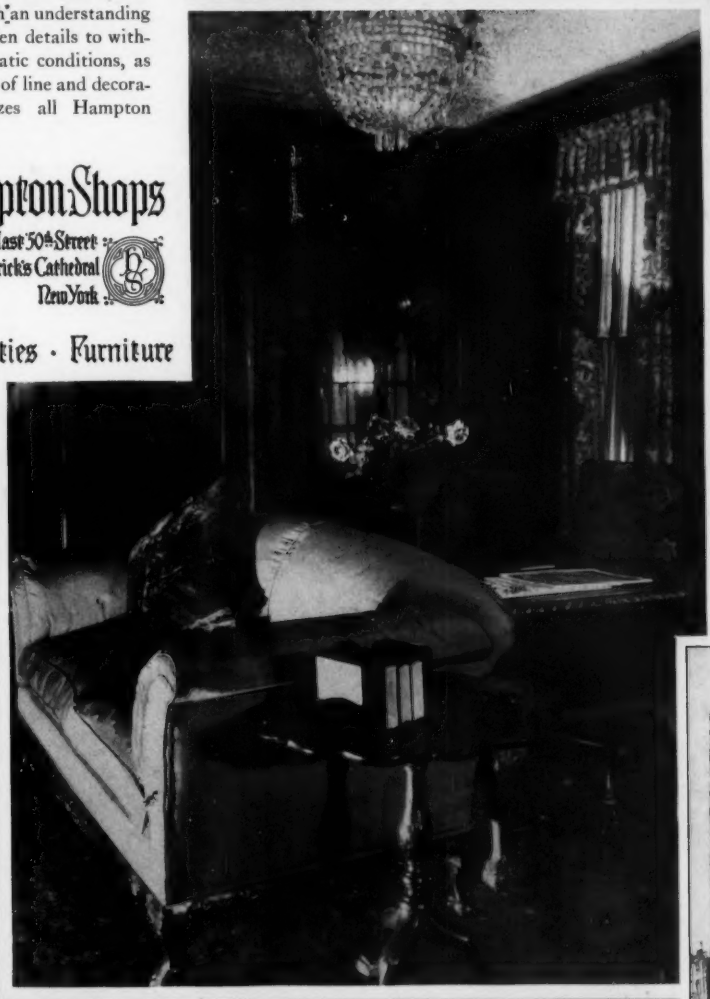

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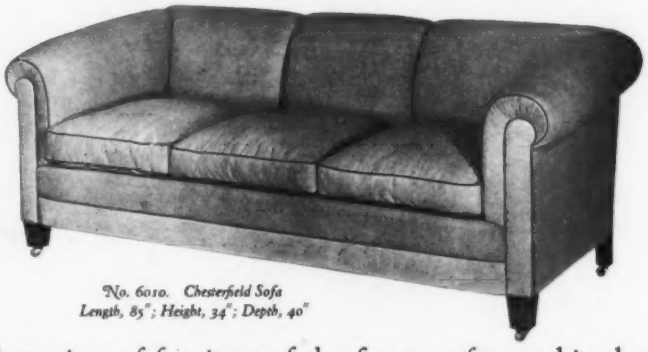
MODERN ideas of comfort demand all-over upholstered furniture—not always in accord with period dictates. That comfort and style can be combined is shown in this sofa, in which the minimum of wood frame is exposed and the curves of upholstery are restrained in character. A quiet covering completes a modern piece of furniture of the finest craftsmanship that will unite satisfactorily with any period style of substantial type.



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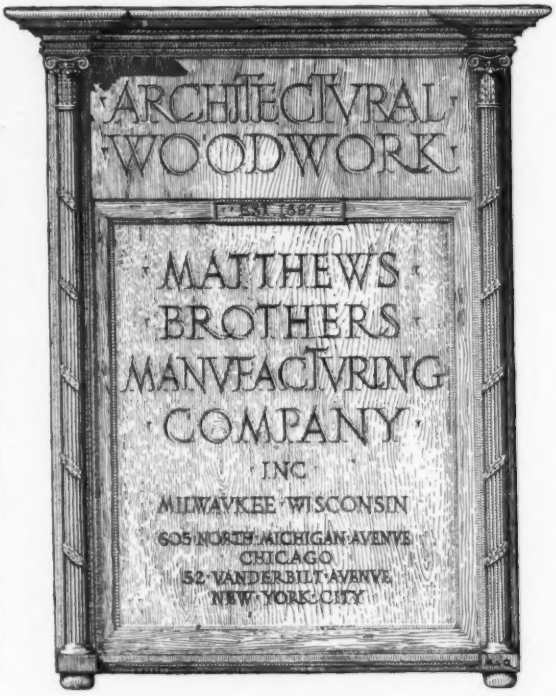

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The 18th century broché silk from which the pattern for this damask was taken was designed by Philippe de Lasalle, often called "the Raphael of silk design." It is now preserved in the Musée des Tissus de Lyon, together with other rare fabrics by the same artist.

This golden pheasant pattern is remarkable in that it does not repeat itself across the entire width of 50 inches —a technical achievement possible on few looms in existence. There are nearly twenty thousand threads in the warp alone—each one made of three strands of organzine, the highest grade of silk.

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F. Schumacher & Co., Importers, Manufacturers, Distributors to the trade only of Decorative Drapery and Upholstery Fabrics, 60 West 40th Street, New York City. Offices in Boston, Chicago and Philadelphia.

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SHAKESPEARE'S home at Stratford-on-Avon contained the original of this late Sheraton model side chair. The illustration shows a faithful reproduction by the Elgin A. Simonds Co. The old Colonial original of the mirror hangs in the Metropolitan Museum of Art.

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and let us place before you, when you need them, the facts about the Estey, and the complete and practical help we are able to give in adapting this organ to any building or space required.

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A floor of Armstrong's Cork Tile of attractive design in the main corridor of the Reid Memorial Hospital, Chicago, Illinois

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FLOOR *coverings* in hospital corridors and rooms need not concern you when the *floor* is Armstrong's Cork Tile; they are not needed. Comfort, safety and noiselessness underfoot are inherent in the resilient texture of the clean cork shavings of which Armstrong's Cork Tile is made. As for appearance, the distinctive mottled surface, the soft shades of brown and the attractive designs afford a most pleasing effect.

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The 24-page book, "Armstrong's Cork Tile," is illustrated in color and contains a complete description and detailed specifications. A copy and sample tile will be forwarded you free of charge upon request.

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N U M B E R S I X O F A S E R I E S

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American Walnut was chosen for this room, say the designing architects, "because of its richness of color and appropriateness in the general scheme of design."

The character of the house, a show place of the Middle West, is Italian Renaissance. The chief ornamentations in the library are the heavily coffered ceiling and the fireplace. The decorative frieze between cornice and wainscot consists of a repeated motif painted on canvas in dull gold and subdued reds and blues. The same colors are used, with different design, between the solid walnut beams in the ceiling, whose mouldings and soffits are also treated in these colors.

The mantel, of walnut, is exquisitely carved in the Renaissance manner, the fireplace being red Numidian marble. The walnut furniture is Italian Renaissance, although period is not closely observed. Hangings and upholstery are wine-colored, the carpet in the same tone, blending delightfully with the walnut wall panels.

The ensemble feeling of the room is warm and pleasant, with a rare touch of quiet and seclusion, soothing and refreshing by its sheer artistic merit.

Like their masters of old, leading architects today find in walnut the most satisfactory medium for furniture and interior finish, combining its fourfold virtues of being light, stable, durable and handsomely figured.

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Booklets on Request

Mt. Sinai Hospital, Cleveland, Ohio. Architects: Geo. B. Post & Sons, New York City. Contractors: Reaugh Construction Co., Cleveland. Style of Architecture: English Renaissance of the Georgian Period. Ground floor treatment of Indiana Limestone. Brick walls trimmed with limestone on the first story and terra cotta above to match the limestone.

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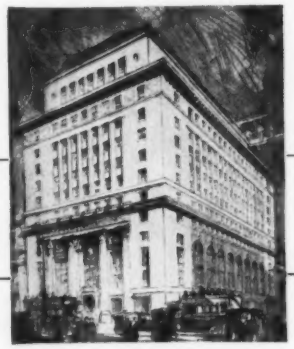

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Selected List of Manufacturers' Literature

FOR THE SERVICE OF ARCHITECTS, ENGINEERS, DECORATORS, AND CONTRACTORS

The publications listed in these columns are the most important of those issued by leading manufacturers identified with the building industry. They may be had without charge, unless otherwise noted, by applying on your business stationery to *The Architectural Forum*, 142 Berkeley St., Boston, Mass., or the manufacturer direct, in which case kindly mention this publication.

Listings in this Department are available to any manufacturer at the rate of $5 per listing per month.

ASH HOISTS—ELECTRIC AND HAND POWER

Gillis & Geoghegan, 544 West Broadway, New York, N. Y.

General Catalog. 8½ x 11 in. 20 pp. Fully illustrated. Contains specifications in two forms (with manufacturer's name and without). Detail ¼" scale for each telescopic model and special material-handling section.

The Man-Saving Load Lifter. 5½ x 8¼ in. 8 pp. Illustrated. Describes G&G Telescopic and Non-Telescopic Hoists for handling material in factories.

BOILERS—See Heating Equipment

BRICK

American Face Brick Association, 1751 Peoples Life Bldg., Chicago, Ill.

The Story of Brick. Booklet. 7 x 9¼ in. 55 pp. Illustrated. Presents the merits of face brick from structural and artistic standpoints. Tables of comparative costs.

The Home of Beauty. Booklet. 8 x 10 in. 72 pp. Color plates. Presents fifty designs for small face brick houses submitted in national competition by architects. Text by Aymar Embury II, Architect. Price 50c.

Bungalow and Small House Plans. Booklets. 8½ x 11 in. 50 pp. Illustrated. Four booklets, showing a variety of designs for small face-brick houses, covering 3, 4, 5, 6, 7 and 8 room houses. Price, 25c. each, $1 for the set.

A Manual of Face-Brick Construction. Booklet. 8½ x 11 in. Textbook on construction of the brick wall and various uses of face brick. 31 colored plates of brick houses with plans. Price, $1.00.

Architectural Details in Brickwork. Series 1, 2, 3. 8½ x 11 in. Very useful to the architect or draftsman. Sent free to architects applying on their office stationery. To others, $1.50.

BUILDING FINANCE

S. W. Straus & Co., 565 Fifth Ave., New York, N. Y.

The Straus Plan of Financing. Booklet. 8 x 6 in. 24 pp. Illustrated. Describes Straus system of co-operation with Architects, Builders, Engineers and Brokers in financing important building operations; also the making of construction loans on the larger and better properties in our large cities.

Forty Years Without Loss to Any Investor. Booklet. 8 x 5 in. 38 pp. Illustrated. A carefully prepared booklet for the thinking investor. Describes Straus bonds, the property upon which loans are made, and explains the Straus plan of safeguards which made possible the 40-year record.

BUILDING STONE—See Stone, Building

CEMENT

Atlas Portland Cement Company, 25 Broadway, New York, N. Y.

The Stucco House. Booklet. 8½ x 11 in. 96 pp. Illustrated. Contains valuable data on application of Portland Cement Stucco for those interested in building. Also photographic reproductions of beautiful and unusual stucco finishes, instructions and specifications.

Atlas Handbook on Concrete Construction. Book. 4¼ x 6½ in. 144 pp. Illustrated. Provides in convenient form practical information on concrete, plain and reinforced. Written from the practical rather than from the technical point of view. A valuable pocket text-book.

Carney's Cement Company, Mankato, Minn. Booklet. 8 x 10 in. 20 pp. Illustrated. Complete information on product, showing prominent buildings in which this cement has been used.

Louisville Cement Co., 315 Guthrie St., Louisville, Ky.

Brixment. Booklet. 7½ x 5 in. 16 pp. Illustrated. Brixment, what it is, what it does, how it does it and why.

Sandusky Cement Co., Dept. F, Cleveland, Ohio.

Medusa White Portland Cement, Stainless. Booklet. 8½ x 11 in. 48 pp. Illustrated.

Medusa Waterproof White Portland Cement. Booklet 6 x 9 in. 32 pp. Illustrated.

Medusa Review. 6 x 9 in. 18 pp. Illustrated. House organ issued bi-monthly.

CONDUIT

National Metal Molding Co., 1113 Fulton Building, Pittsburgh, Pa.

Bulletin of all National Metal Molding Products. In correspondence folder. 9½ x 11½ in.

Sherarduct. Circular. 5 x 8 in. Illustrated.

Flexsteel. Circular. 5 x 8 in. Illustrated.

CONSTRUCTION, FIREPROOF

National Fire Proofing Co., 250 Federal St., Pittsburgh, Pa.

Standard Fire Proofing Bulletin 171. 8½ x 11 in. 32 pp. Illustrated. A treatise on fire proof floor construction.

Northwestern Expanded Metal Co., 934 Old Colony Building, Chicago, Ill.

Fireproof Construction. Catalog. 6 x 9 in. 72 pp. Illustrated. Handbook of practical suggestions for architects and contractors. Describing Nemco Expanded Metal Lath.

Fire-proof Construction. Handbook. 6 x 9 in. 72 pp. Illustrated. Describing Kno-Burn expanded metal lath.

United States Gypsum Company, 205 West Monroe St., Chicago, Ill.

Pyrobar Gypsum Tile. Booklet. 8½ x 11 in. 32 pp. Illustrated. Details and specifications for fireproof partitions.

Bulletins, 8½ x 11 in., containing details and specifications for Pyrobar voids for use with reinforced concrete joist floor construction; Pyrobar roof tile; and monolithic gypsum floors and roofs.

DAMPPROOFING

The Truscon Laboratories, Detroit, Mich.

Booklet. 5¼ x 7¼ in. Illustrated. Contains descriptions and specifications of black dampproofing compounds for interior and exterior use.

DOORS, WINDOWS AND TRIM, METAL

Dahlstrom Metallic Door Company, 425 Buffalo Street, Jamestown, N. Y.

Architectural Catalog. 10 x 14 in. 46 pp. 11 sections. Illustrated. Catalog showing our regular styles and types of hollow metal doors and interior trim. Various types of frames and other architectural shapes also illustrated.

Architectural Portfolio. 14 x 18 in. 30 pp. Illustrated. Portfolio of various designs and types of Dahlstrom doors. Drawings and details of each style or type. This is only sent free to reliable architects.

The Compound & Pyrono Door Company, St. Joseph, Mich.

Pyrono Handbook for Architects and Contractors. 8½ x 11 in. 16 pp. Contains full information regarding Pyrono Fireproof Veneered Doors and Trim, with complete details and specifications.

Pyrono details in sheet form for tracing.

The G. Drouvé Company, Bridgeport, Conn.

Daylighting the Factory. Booklet. 8½ x 11 in. 26 pp. Illustrated. Describes and illustrates the "Anti-Pluvius" puttyless skylight construction. Also contains interesting information on how to judge a skylight and the advantages of skylighting industrial plants.

DUMBWAITERS

Kaestner & Hecht Co., Chicago, Ill.

Bulletin 520. Describes K. & H. Co. electric dumbwaiters. 8 pp.

Sedgwick Machine Works, 151 West 15th Street, New York.

Catalog and Service Sheets. Standard specifications, plans and prices for various types, etc. 4¼ x 8¼ in. 60 pp. Illustrated.

ELECTRICAL EQUIPMENT

Frink, Inc., I. P., 24th Street and 10th Avenue, New York, N. Y.

Catalog 415. 8½ x 11 in. 46 pp. Photographs and scaled cross sections. Specialized bank lighting, screen and partition reflectors, double and single desk reflectors and Polaralite Signs.

General Electric Company, Schenectady, N. Y.

Wires and Cables. Booklet. 8 x 10½ in. 85 pp. Illustrated. Four bulletins in a binder, describing wires and cables in general, conductors insulated with vulcanized rubber compound, varnished cambric and paper insulated cables, splicing materials and junction boxes for cable installations, armored cables.

Electric Fans. Folder. 6 pp. 3¼ x 6 in. Illustrated. Describes 1922 line of electric fans, giving catalog numbers, voltages and frequencies.

Reliable Wiring Devices. Catalog. 3 x 4¾ in. 206 pp. Illustrated. Pocket catalog giving prices, schedule classifications and data for socket receptacles, switches, rosettes, cutouts and fuses for miscellaneous devices.

Lighting of Public Buildings. Bulletin. 6 x 9 in. 25 pp. Illustrated. Describes lighting of galleries, banks, museums, libraries, municipal, county and state buildings.

Hart & Hegeman Mfg. Co., 342 Capitol Ave., Hartford, Conn.

A new H & H Switch. Leaflet. 3½ x 6 in. 4 pp. Illustrated. Illustrates a new H & H composition base push switch of DeLuxe quality.

Tumbler Switches. Booklet. 3½ x 6 in. 6 pp. Illustrated. Shows complete line of H & H Tumbler Switches.

H & H Elexits. Booklet. 8 x 10½ in. Illustrated. Shows new complete line of Elexits—places for lights. May be used for Wall Receptacles or Electric Fixtures.

H & H Radio Button Push Switches. Booklet. 3½ x 6 in. Illustrated. Radio Luminous Buttons applied to Push Switches and Sockets.

Kohler Co., Kohler, Wis.

Kohler Automatic Power and Light 110 Volt D. C. Booklet. 5 x 7 in. 32 pp. Illustrated. Describes a standard voltage automatic, electric power and light plant for isolated homes.

Simplex Wire & Cable Co., 201 Devonshire Street, Boston, Mass.

Simplex Manual Catalog and reference book. 6¾ x 4¼ in. 92 pp. Contains in addition to information regarding Simplex products, tables and data for the ready reference of architects, electrical engineers and contractors.

Sprague Electric Works of the General Electric Company, 527 West 34th St., New York, N. Y.

Panel Boards and Cabinets. Catalog No. 47901. 8 x 10½ in. 70 pp. Illustrated. Panel Boards and Cabinets shown in this catalog have been selected after careful study of the general requirements. All appliances listed herein meet with the requirements of the National Board of Fire Underwriters.

Panel Circuits. Bulletin No. 47941. 8 x 10½ in. 8 pp. Illustrated. In addition to circuits for panel boards illustrated, a full line of circuits for panel boards having fuses inside branch circuit switches is also listed.

Panel Boards and Cabinets. Bulletin No. 47942. 8 x 10½ in. 16 pp. Illustrated. This bulletin covers the ever increasing demand for devices that provide maximum safety to the operator.

Dead Front Panels. Pamphlet No. 727. 5¼ x 7¾ in. 8 pp. Illustrated. A "Safety First" pamphlet covering Safety Panels and Dead Front Switchboards, for use in office buildings, factories, theaters, department stores, public buildings and in all places where the switches may be operated by persons ignorant of the changes of contact with current-carrying parts.

SELECTED LIST OF MANUFACTURERS' PUBLICATIONS — *Continued from page 61*

ELECTRICAL EQUIPMENT — Continued

Varnum Door Engine Company, 949 West 16th St., Los Angeles, Calif.
Varnum Electric Door Engines. Booklet. 5 x 7¼ in. 16 pp. Illustrated. Descriptive booklet containing illustrations and list of representative institutions now using Varnum Door Engines.

ELEVATORS

Kaestner & Hecht Co., Chicago, Ill.
Bulletin 500. Contains 32 pp. Giving general information on passenger elevators for high buildings.

Otis Elevator Company, 11th Ave. & 26th Street, New York, N. Y.
Otis Push Button Controlled Elevators. Booklet. 6 x 9 in. 56 pp. Illustrated. Detailed description of Otis Push Button Elevators. Their uses in residences, stores, institutions, apartment houses, business offices and banks, etc.
Otis Gravity Spiral Conveyors. Booklet. 6 x 9 in. 56 pp. Illustrated. Gravity spiral conveyors for lowering packaged merchandise, boxed, cased and bundled goods in factories, warehouses, terminal buildings, etc.
Otis Electric Traction Elevators. Booklet. 9 x 12 in. 28 pp. Illustrated. Full details and illustrations of Otis geared and gearless traction elevators for all types of buildings.
Otis Escalators. Booklet. 6 x 9 in. 36 pp. Illustrated. Description of step and cleat type single and double file escalators (moving stairways).

Sedgwick Machine Works, 151 West 15th Street, New York.
Catalog and descriptive pamphlets. 4¼ x 8¼ in. 70 pp. Illustrated. Descriptive pamphlets on hand power freight elevators, sidewalk elevators, automobile elevators, etc.

FENCES

American Fence Construction Co., 130 West 34th St., New York.
Afco Factory Fences. Booklet. 9 x 12 in. 32 pp. Illustrated.
Residential Fences. Booklets. 7 x 2½ in. Illustrated. A series of booklets on residential fences consisting of photographs and brief descriptions.

Page Steel and Wire Company, Bridgeport, Conn.
Page American Ingot Iron Fence. Booklet. 4 x 6½ in. 76 pp. Illustrated. Complete information, with diagrams, sizes, etc., for those interested in rust-resisting iron fence made of ARMCO iron.
Page Ornamental Fence for Lawn and Garden. Booklet. 6 x 9 in. 12 pp. Illustrated. Description, with photographs and diagrams of lawn fence and gates. Complete instructions for ordering fence.

The Stewart Iron Works Company, Cincinnati, Ohio.
Book of Designs "B." 9 x 12 in. 80 pp. Illustrated. Book of designs illustrated from photographs of ornamental iron fence and entrance gates erected by us. Valuable to architects.

FIRE DOORS — See Doors, Windows and Trim, Metal

FIREPLACE EQUIPMENT

Covert Co., H. W., 137 E. 46th Street, New York, N. Y.
Hints on Fireplace Construction. Catalog. 5½ x 8½ in. 11 pp. Illustrated. Diagrams of construction and installation of Covert "Improved" and "Old Style" Dampers and Smoke Chambers. Also illustrations of Covert brass and wrought iron Fireplace Fittings.

FLOORING

Armstrong Cork & Insulation Co., 132 24th Street, Pittsburgh, Pa.
Linotile Floors. Catalog. 6 x 9 in. 40 pp. Color plates. Describes Linotile, a composition of ground cork, wood flour, linseed oil and various gums and pigments in tile form.
Armstrong's Cork Tile. Revised Edition. Booklet. 24 pp. 5 x 7 in. Illustrated in color. Contains complete specifications.

Armstrong Cork Co. (Linoleum Dept.), Lancaster, Pa.
Armstrong's Linoleum Floors. Catalog. 8½ x 11 in. 54 pp. Color plates. A technical treatise on linoleum, including table of gauges and weights and specifications for installing linoleum floors.
Decorative Floors. Booklet. 11¼ x 15 in. 16 pp. Color plates.
Armstrong's Linoleum Pattern Book, 1922. Catalog. 3½ x 6 in. 168 pp. Color plates. Reproductions in color of all patterns of linoleum and cork carpet in the Armstrong line.
Quality Sample Book. Three books. 3½ x 5¾ in. Showing all gauges and thicknesses in the Armstrong line of linoleum and cork carpets.
Detailed Directions for Laying and Caring for Linoleum. Handbook. 5 x 7 in. 48 pp. Instructions for linoleum layers and others interested in learning most satisfactory methods of laying and taking care of linoleum.
Business Floors. Booklet. 6 x 9 in. 48 pp. Illustrated in color. Explains use of linoleum for offices, stores, etc., with reproductions in color of suitable patterns, also specifications and instructions for laying.

Congoleum Company, Inc. (Linoleum Dept.), Philadelphia, Pa.
"Specifications for Laying Linoleum and Cork Carpet, according to the Congoleum Company's new method compiled after years of careful research."
Linoleum Service Sheet. Gives complete printed specifications as well as detail drawings showing application in specific cases such as thresholds, staircases, under radiators, etc.
Installation and Care of Battleship Linoleum. Booklet. 6 x 9 in. 24 pp. Illustrated. Instructions as to the uses of Battleship Linoleum, its laying and care.
Pocket Pattern Book. Descriptive Booklet. 3½ x 8½ in. 64 pp. Illustrated. Shows color reproductions of every grade and color of Gold Seal Battleship Linoleum, Inlaid Linoleum, Cork Carpet and also all patterns of the Gold-Seal Line.

Maple Flooring Manufacturers Assn., Stock Exchange Bldg., Chicago, Ill.
Flooring of Maple, Beech and Birch. Booklet. 9½ x 7 in. 46 pp. Illustrated. A complete manuscript on Maple, Beech and Birch Flooring, written by Forest Crissey.

FLOORING — Continued

Maple Flooring Manufacturers Assn.—Continued
Color Harmony in Floors. Booklet. 24 pp. 6⅜ x 4½ in. Illustrated. Reproductions in six colors of 12 styles of maple, beech and birch floors, with a short message on the subject.
How to Lay and Finish Maple, Beech and Birch Floors. Booklet. 6½ x 3⅜ in. 16 pp. Illustrated. A handbook on laying maple, beech and birch floors and on keeping them in good condition.
Grading Rules for Maple, Beech and Birch Flooring. Leaflet. 6½ x 3⅜ in. 8 pp. Illustrated. Contains information on grades, standard measurement, custom governing re-inspection, etc.

The Marbleloid Co., 461 Eighth Ave., New York, N. Y.
The Universal Flooring for Modern Buildings. Booklet. 6¾ x 9¾ in. 32 pp. Illustrated. Describes uses and contains specifications for Marbleloid flooring, base, wainscoting, etc.
Marbleloid Flooring for Hospitals. Bulletin. 8½ x 11 in. 4 pp. Illustrated. Describes the especial features of this composition floor for hospital buildings.
Marbleloid Specifications. Booklet. 8½ x 11 in. 4 pp. Illustrated.
Marbleloid Flooring for Schools. Bulletin. 8½ x 11 in. 4 pp. Illustrated. Describes special features of this composition floor for school buildings.

Thos. Moulding Brick Company, 133 West Washington St., Chicago, Ill.
T-M-B Mastic Flooring. Catalog. 6 x 9¼ in. 16 pp. Illustrated. Includes specifications also.

Muller Co., Franklyn R., Waukegan, Ill.
Asbestone Composition Flooring. Circulars. 8½ x 11 in. Description and Specifications.

The Nairn Linoleum Company, 179 Belgrove Drive, Kearny, N. J.
Linoleum. Booklet. 5½ x 8½ in. 68 pp. Illustrated in color. Reproductions in color of Inlaid, Printed, Plain and Battleship Linoleum; also Cork Carpets and Felt Base Floor Coverings.

Oak Flooring Advertising Bureau, 1057 Ashland Block, Chicago, Ill.
Modern Oak Floors. Booklet. 6½ x 9¾ in. 24 pp. Illustrated. A general book that tells the complete story on Oak Flooring.
Oak Flooring, How and Where to Use it. Booklet. 3½ x 6¾ in. 16 pp. Illustrated. A small, technical book showing the general rules, standard thickness and widths, how to lay, finish and care for oak floors.

FLOOR HARDENERS

General Chemical Company, The, 25 Broad Street, New York, N. Y.
Making Concrete Wear Like Iron. Booklet. 4 pp. 8½ x 11 in. Illustrated. Describes Hard-n-tyte and its application to concrete floors.
Casehardening Concrete. Folder. 3¾ x 8½ in. 6 pp. Illustrated. Describes treatment of concrete surfaces with Hard-n-tyte so that they become literally "casehardened."
The Hard-n-tyte Specification. Booklet. 8½ x 11 in. 4 pp. Gives exact specifications for concrete floor finish.

Sonnesborn Sons, Inc., L., 116 Fifth Avenue, New York.
Concrete and Lapidolith. Booklet. 5½ x 8½ in. 24 pp. Illustrated. Describing relation of Lapidolith chemical floor hardener to concrete construction.
Why Lapidolise? Booklet. 8½ x 11 in. 11 pp. Illustrated. Reasons why Lapidolith should be specified.
Lapidolith Specifications. Circular. 8½ x 10¾ in. 2 pp.

FLOOR HARDENERS (CHEMICAL)

The Truscon Laboratories, Detroit, Mich.
Agatex and Its Performances. Booklet. 8½ x 11 in. 16 pp. Describes use of Agatex Liquid Chemical for hardening cement floors.

FLOOR HARDENERS (METALLIC)

The Truscon Laboratories, Detroit, Mich.
Truscon Floor Hardener. Pamphlet. 7¾ x 5½ in. 18 pp.

FURNACES — See Heating Equipment

FURNITURE

Estey Organ Company, Brattleboro, Vt.
Pipe Organs. Complete specifications and full information furnished to the architect for pipe organ to be installed in any given residence, upon receipt of plans and other particulars.

Hampton Shops, 18 East 50th St., New York, N. Y.
Glimpses from Hampton Exhibits. Brochure. 16 pp. 5 x 7½ in. Illustrated. Shows examples of Hampton work and gives one an idea of their resources. Of interest to the client as well as to the architect.

Kensington Mfg. Company, 14 East 32nd St., New York, N. Y.
Photographs and full description of hand-made furniture in all the period styles furnished promptly in response to a specific inquiry.
Illustrated booklet indicative of the scope, character and decorative quality of Kensington furniture mailed on request.

Kewaunee Mfg. Company, Kewaunee, Wis.
Book No. 13. 6 x 9 in. 194 pp. Illustrated. Full description of Kewaunee Vocational Equipment for domestic science, demonstration dining rooms, fitting rooms, drafting rooms, manual training and shop-equipment, kindergarten and hospital equipment and dietetic tables.
Book No. 14. 6 x 9 in. 226 pp. Illustrated. Shows Laboratory furniture for chemistry, physics, biology, zoology, electrical and physiography laboratories, medical college, hospital laboratory equipment, industrial and commercial laboratory equipment. Engineering service gratis.

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General Offices: WATERBURY, CONN.

In Canada: ANACONDA AMERICAN BRASS LIMITED: New Toronto, Ontario

ANACONDA
BRASS PIPE

SELECTED LIST OF MANUFACTURERS' PUBLICATIONS — *Continued from page 62*

FURNITURE — Continued

Charles P. Rogers & Co., Inc., 14-16 East 33rd St., New York, N. Y.
A Guide to Buying Quality Furniture, Beds and Bedding. Booklet. 4 x 6 in. Illustrated. Describes the manufacture of good furniture as compared with the ordinary kind.

Elgin A. Simonds Company, Syracuse, N. Y.
Furnishing the Home. 24 pp. 6 x 9 in. Illustrated. A treatise on modern interior decoration.

GLASS CONSTRUCTION

Mississippi Wire Glass, 220 Fifth Avenue, New York.
Mississippi Wire Glass. Catalog. 3½ x 8½ in. 32 pp. Illustrated. Covers the complete line.

GRANITE—See Stone, Building

HARDWARE

Cutler Mail Chute Company, Rochester, N. Y.
Cutler Mail Chute Model F. Booklet. 4 x 9¼ in. 8 pp. Illustrated.

McKinney Mfg. Co., Pittsburgh, Pa.
McKinney Cabinet Hardware. Catalog. 6 x 9 in. 32 pp. Illustrated. Describes complete line of hardware for cabinet and furniture work.
McKinney Hardware for Sliding Doors. Booklet. 6 x 9 in. 18 pp. Illustrated. Describes different types of sliding door hardware.

Stanley Works, The, New Britain, Conn.
Wrought Hardware. Catalog. BJ10. 6½ x 10 in. Color plates. Shows all of the Stanley Works products made of steel from their own mills.

Vonnegut Hardware Co., Indianapolis, Ind.
Von Duprin Self-Releasing Fire Exit Devices. Catalog. 12F 8 x 11 in. 41 pp. Illustrated.
"Saving Lives." Booklet. 3¼ x 6 in. 16 pp. Illustrated. A brief outline why Self-Releasing Fire Exit Devices should be used.

HEATING EQUIPMENT

American District Steam Company, North Tonawanda, N. Y.
Bulletin No. 150-AF. 6 x 9 in. 32 pp. Illustrated. Describes the Adsco System of Atmospheric Steam Heating and explains how it saves 20 to 30% of fuel cost. Tells how to figure radiation.
Catalog No. 21-AF. 6 x 9 in. 200 pp. Illustrated. Lists and describes the full line of equipment and devices manufactured for use on underground and interior steam mains, expansion joints, steam meters, condensation meters, traps, flange fittings, angle fittings, manhole curbs, alignment guides, etc.

Clarage Fan Company, Kalamazoo, Mich.
Catalog No. 52. 8½ x 11 in. 84 pp. Illustrated. Describes Clarage Kalamazoo Multiblade Fans and Heaters for use in schools, churches, hospitals and industrial plants. Engineering data, capacity tables and dimensions included.

James B. Clow & Sons, 534 S. Franklin Street, Chicago, Ill.
Gasteam. Catalog. 6 x 9 in. 16 pp. Illustrated. New radiator using gas for fuel.

Excelso Specialty Works, 119 Clinton St., Buffalo, N. Y.
Excelso Water Heater. Booklet. 12 pp. 3 x 6 in. Illustrated. Describing the new Excelso method of generating domestic hot water in connection with heating boilers. (Firepot Coil eliminated.)

Gorton & Lidgerwood Co., 96 Liberty Street, New York, N. Y.
Gorton Self-Feeding Boilers. Booklet. 4¼ x 7¼ in. 32 pp. Illustrated. Descriptions, specifications and prices.

Johnson Service Company, 149 Michigan St., Milwaukee, Wis.
Regulation of Temperature and Humidity. Booklet. 11¾ x 8½ in. 64 pp. Illustrated. Describes Johnson system of pneumatic, automatic regulation of temperature and humidity, and illustrates thermostats, valves, air compressors, dampers and other parts.
Johnson Electric Thermostats, Valves and Controllers. Booklet. 6¼ x 3½ in. 24 pp. Illustrated. Excellent plates showing electric thermostats and controllers.

Kelsey Heating Company, James St., Syracuse, N. Y.
Booklet No. 5. 4 x 9 in. 32 pp. Illustrated. A dealers' booklet showing the Kelsey Warm Air Generator Method of warming and distributing air. Gives dimensions, heating capacities, weights, kind of coal recommended, and shows the mechanical and gravity system of heating homes, churches and schools.
Monroe Pipeless Booklet. 4½ x 8 in. 20 pp. Illustrated.
Monroe Tubular Heater. Booklet. 4½ x 8 in. 20 pp. Illustrated. General Booklet giving capacities, dimensions, weights, etc.
Syracuse Pipeless Booklet. 4½ x 8 in. 12 pp. Illustrated. General Booklet, giving sizes and capacities.

Kewanee Boiler Co., Kewanee, Ill.
Kewanee on the Job. Catalog. 8½ x 11 in. 80 pp. Illustrated. Showing installations of Kewanee boilers, water heaters, radiators, etc.
Catalog No. 73. 6 x 9 in. 35 pp. Illustrated. Describes Kewanee steel power boilers with complete specifications.

Minneapolis Heat Regulator Company, Minneapolis, Minn.
The Heart of the Heating Plant. Catalog. 6 x 9 in. 20 pp. Illustrated. Describing the Minneapolis Heat Regulator, its construction, application and operation for the automatic control of temperature where coal, gas, fuel oil or street steam is used.

Page Boiler Company, The Wm. H., 141 West 36th Street, New York, N. Y.
Page Boilers. Catalog. 4½ x 8 in. 84 pp. Illustrated. Descriptions with specifications of the Volunteer Round and Monarch Square Sectional Boilers; also the Monarch Up-Draft and Down-Draft Smokeless Boiler; with method for apportioning size of boiler and radiation, and other heating data.

HEATING EQUIPMENT — Continued

United States Radiator Corporation, Detroit, Mich.
The Complete Line. Catalog. 3¾ x 6½ in. 269 pp. Illustrated. New edition, intended as a handy reference book for those who design or install heating and ventilating systems.
Capitol Smokeless Type Boilers. Booklet. 8½ x 11 in. 12 pp. Illustrated. Describing a new type of low-pressure heating boiler which burns soft coal without smoke.

HEAT REGULATORS—See Heating Equipment

HOISTS

Gillis & Geoghegan, 544 West Broadway, New York.
Hoists for Industrial Plants. Booklet. 6 x 8¾ in. 8 pp. Illustrated. Labor saving service in the lifting or lowering of lighter loads, through the use of G & G Telescopic and Non-telescopic Hoists.
Removing Ashes. Booklet. 6 x 8¾ in. 6 pp. Illustrated. Removing ashes from boiler room directly to wagon by electrically operated Telescopic Hoists.

HOLLOW TILE—See Tile, Hollow

INSULATION

Bishopric Manufacturing Co., 103 Este Ave., Cincinnati, Ohio.
For All Time and Clime. Booklet. 6 x 9 in. 48 pp. Illustrated. Describing the use of Bishopric stucco base and Bishopric plaster base.

Philip Carey Co., The, Cincinnati, Ohio.
Carey Asbestos and Magnesia Products. Catalog. 6 x 9 in. 72 pp. Illustrated.

United States Gypsum Company, 205 West Monroe St., Chicago, Ill.
Bulletin. 8½ x 11 in. Details and specifications for insulating roofs to prevent condensation.

United States Mineral Wool Co., 280 Madison Ave., New York, N. Y
The Uses of Mineral Wool in Architecture. Booklet. 5¼ x 6½ in. 24 pp. Illustrated. Describes properties of mineral wool as insulation against heat, frost, sound. Specifications and section drawings for use as a fireproofing. Rule for estimate and cost.

KITCHEN EQUIPMENT

Wm. M. Crane Company, 16-20 West 32nd St., New York, N. Y.
VULCAN Gas Ranges and Appliances. Booklet. 5 x 8 in. 50 pp. Illustrated. Describes complete line, including VULCAN SMOOTH-TOP Compact Cabinet Gas Ranges for kitchens in the home.
VULCAN Gas Equipment for Hotels, Hospitals, Restaurants, etc. Booklet. 5 x 8 in. 45 pp. Illustrated. Equipment for heavy-duty cooking requirements, with information of value to architects in planning kitchens.

LATH, METAL AND REINFORCING

North Western Expanded Metal Co., 934 Old Colony Building, Chicago, Ill.
Designing Data. Catalog. 6 x 9 in. 94 pp. Illustrated. Describes most efficient use of Econo Expanded Metal Reinforcing.
Formless Concrete Construction. Catalog. 6 x 9 in. 80 pp. Illustrated. Describes use of T-Rib Chanelath, a form and reinforcing for concrete.

LEADERS AND GUTTERS

Copper & Brass Research Assn., 25 Broadway, New York, N. Y.
Copper Roofing. Booklet. 8½ x 11 in. 32 pp. Illustrated. Gives information regarding weights of various roofing materials. Describes up-to-date practice and methods of laying copper roofs; decorative effects and how to obtain them. Gives specifications and details. Flashings, reglets, gutters and leaders, cornices and copper-covered walls.

MAIL CHUTES

Cutler Mail Chute Company, Rochester, N. Y.
Cutler Mail Chute Model F. Booklet. 4 x 9¼ in. 8 pp. Illustrated.

MANTELS

Arnold & North, Inc., 124 East 41st St., New York, N. Y.
Booklet. 5 x 6 in. Contains photographic reproductions of a variety of old English and Colonial mantelpieces with complete information as to sizes and prices.

Arthur Todhunter, 414 Madison Ave., New York, N. Y.
Mantels and Fireplace Equipment. Booklet. 8½ x 11 in. Illustrated. Separate sheet plates showing mantels installed and furnished, also andirons and grates grouped with suitable pieces, also lanterns, weather-vanes and hand-wrought hardware. All sizes and descriptions given on each plate.

The Greenville, South Carolina, plant of The Victor Monaghan Co., one of the largest textile properties in the South, operating in Greenville, Seneca, Walhalla, Jonesville, Arlington, Union and Greer, South Carolina

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The modern idea in factory management is to provide a "good place to work in." Especially in plants that employ women, good surroundings have been shown to lower turnover and increase production.

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The fence illustrated above was installed by General Equipment Co., of Charlotte, N. C.

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ARMCO Ingot Iron

The only wire fence made of Armco Ingot Iron

SELECTED LIST OF MANUFACTURERS' PUBLICATIONS — *Continued from page 64*

MARBLE

The Georgia Marble Company, Tate, Ga. New York office, 1328 Broadway.
Why Georgia Marble is Better. Booklet. 3¼ x 6 in. Gives analysis, physical qualities, comparison of absorption with granites, opinions of authorities, etc.
Convincing Proof. Booklet. 3¼ x 6 in. 8 pp. Classified list of buildings and memorials in which Georgia Marble has been used, with names of Architects and Sculptors.

Tompkins-Kiel Marble Company, 505 Fifth Ave., New York, N. Y.
Reproductions in natural colors of imported and domestic marbles and stone for interior and exterior uses.
Bulletins, 9¼ x 12¾ in., illustrating buildings of various types in which Tompkins-Kiel Marble Company's imported and domestic marbles and stone have been used.

Vermont Marble Company, Adv. Dept., Proctor, Vt.
The Book of Vermont Marble. Booklet. 8½ x 11 in. 68 pp. Illustrated. A reference book for architects, describing various kinds of Vermont Marble, with illustrations and details.
Marble Banks and Modern Business. Booklet. 7¾ x 10½ in. 48 pp. Illustrated. Contains many pictures of important Vermont Marble bank work, with certain tests and analyses relating to the product.

METAL LATH—See Lath, Metal and Reinforcing

METALS

American Brass Company, Waterbury, Conn.
Illustrated pamphlet describes the use and adaptability of extruded architectural shapes to meet the architect's design.

American Sheet & Tin Plate Co., Frick Building, Pittsburgh, Pa.
Reference Book. Pocket Ed. 2¾ x 4¾ in. 168 pp. Illustrated. Covers the complete line of Sheet and Tin Mill Products.
Apollo and Apollo-Keystone Galvanized Sheets. Catalog. 8½ x 11 in. 20 pp. Illustrated.
Research on the Corrosion Resistance of Copper Steel. Booklet. 8½ x 11 in. 24 pp. Illustrated. Technical information on results of atmospheric corrosion tests of various sheets under actual weather conditions.
Facts Simply and Briefly Told. Booklet. 8½ x 11 in. 16 pp. Illustrated. Non-technical statements relating to Keystone Copper Steel.
Blank Sheets and Special Sheets. Catalog. 8½ x 11 in. 28 pp. Illustrated. Describes standard grades of Black and Uncoated Sheets, together with weights, bundling tables, etc.
Bright Tin Plates. Catalog. 8½ x 11 in. 16 pp.

Bridgeport Brass Company, Bridgeport, Conn.
Seven Centuries of Brass Making. Booklet. 10½ x 8 in. 78 pp. Illustrated in color. A brief history of the ancient art of Brass Making and its early (and even recent) method of production—contrasted with that of the Electric Furnace Process—a twentieth century achievement of the Bridgeport Brass Company.
Tested High-Speed Brass Rod. Booklet. 10½ x 8 in. 16 pp. Illustrated. Short treatise on the manufacture of Brass Rod for use in Screw Machines, with particular reference to improvements originated by the Bridgeport Brass Company.

Copper & Brass Research Assn., 25 Broadway, New York, N. Y.
Copper Roofing. Booklet. 8½ x 11 in. 32 pp. Illustrated. Gives information regarding weights of various roofing materials. Describes up-to-date practice and methods of laying copper roofs; decorative effects and how to obtain them. Gives specifications and details. Flashings, reglets, gutters and leaders, cornices and copper-covered walls.

METAL TRIM—See Doors, Windows and Trim, Metal

MORTAR COLORS

Clinton Metallic Paint Co., Clinton, N. Y.
Clinton Mortar Colors. Booklet. 3½ x 6¾ in. 8 pp. Illustrated. Complete description of Clinton Mortar Colors with color samples.

PAINTS, STAINS, VARNISHES AND WOOD FINISHES

Cabot, Inc., Samuel, Boston, Mass.
Cabot's Creosote Stains. Booklet. 4 x 8½ in. 16 pp. Illustrated.

S. C. Johnson & Son, Racine, Wis.
The Proper Treatment for Floors, Woodwork & Furniture. Booklet. 6¾ x 8½ in. 32 pp. Illustrated in color. A treatise on finishing hard and soft wood in stained and enameled effects; also natural wood effects.
Portfolio of Wood Panels. 5½ x 10¾ in. 14 pp. A portfolio containing actual panels of finished woods. Also contains valuable information on finishing and re-finishing floors and woodwork.

National Lead Company, 111 Broadway, New York, N. Y.
Handy Book on Painting. Book. 5½ x 3¼ in. 100 pp. Gives directions and formulas for painting various surfaces of wood, plaster, metal, etc., both interior and exterior.
Red Lead in Paste Form. Booklet. 6¼ x 3½ in. 16 pp. Illustrated. Directions and formulas for painting metals.
Came Lead. Booklet. 8¾ x 6 in. 12 pp. Illustrated. Describes various styles of lead cames.
Cinch Anchoring Specialties. Booklet. 6 x 3½ in. 20 pp. Illustrated. Describes complete line of expansion bolts.

The Ripolin Company, Cleveland, Ohio
Ripolin Specification Book. 8 x 10¼ in. 12 pp. Complete specifications and general instructions for the application of Ripolin, the original Holland enamel paint. Also directions for proper finishing of wood, metal, plaster, concrete, brick and other surfaces.

PAINTS, STAINS, VARNISHES AND WOOD FINISHES—Continued

Ruberoid Co., The (formerly the Standard Paint Co.), 95 Madison Avenue, New York, N. Y.
Preservative Coatings. Booklet. 6 x 9 in. 15 pp. Illustrated. Presents in a concise manner the properties and uses of the Ruberoid Company's various paint preparations.

Smith & Co., Edward, P. O. Box 76, City Hall Station, New York, N. Y.
Architect's Hand Book. 4¾ x 7½ in. 24 pp. Specifications and suggestions for painting, varnishing, enameling, etc.

Sonneborn Sons, Inc., L., Dept. 4, 264 Pearl Street, New York.
Paint Specifications. Booklet. 8½ x 10¾ in. 4 pp.

The Truscon Laboratories, Detroit, Mich.
Architects' Specification Handbook. 8½ x 11 in. 108 pp. Complete specifications covering Waterproofings, Dampproofings, Oilproofings, Technical Finishes, Steel Paints, Mill White Paints, Floor Hardeners and Varnishes.

PARTITIONS

Improved Office Partition Company, 25 Grant St., Elmhurst, L. I.
Telesco Partition. Catalog. 8½ x 11 in. 14 pp. Illustrated. Shows typical offices laid out with Telesco partitions, cuts of finished partition units in various woods. Gives specifications and cuts of buildings using Telesco.
Detailed Instructions for erecting Telesco Partitions. Booklet. 24 pp. 8½ x 11 in. Illustrated. Complete instructions, with cuts and drawings, showing how easily Telesco Partition can be erected.

The J. G. Wilson Corporation, 11 East 36th St., New York, N. Y.
Folding Partitions. Booklet. 8½ x 11¼ in. 16 pp. Illustrated. Covers the field of folding partitions for churches, schools, hotels, clubs and public institutions.
Rolling Partitions, Hygienic and Disappearing Door Wardrobes. Booklet. 6 x 9 in. 32 pp. Illustrated. Describes rolling partitions, particularly in churches and schools, and wardrobes as installed in schools and public institutions.

PARTITIONS, WIRE

Page Steel & Wire Company, Bridgeport, Conn.
Page Standard Panel Partition. Booklet. 8½ x 11 in. 6 pp. Illustrated. Uses and advantages of Wire Partition, with Page Standard Panel Specifications. Valuable to architects.

PIPE

American Brass Company, Waterbury, Conn.
Illustrated pamphlet giving tables of weights and price-lists devoted to Brass and Copper Pipe in iron pipe and plumbers' sizes.

A. M. Byers Company, 235 Water St., Pittsburgh, Pa.
Bulletin 26-A. "What Is Wrought Iron?" 8 x 10¾ in. 40 pp. Illustrated. Descriptions of materials and processes employed in manufacturing Byers genuine wrought iron pipe. Factors influencing corrosion. Gives table of pipe sizes, weights, dimensions, tests, etc., and tabulated records of the life of iron and steel pipe in various kinds of service.
Bulletin 30. An Investigation of Pipe Corrosion in Hot Water Service. 8 x 10¾ in. 20 pp. Illustrated. Shows service records of iron, steel and brass pipe used for hot and cold water supply lines in 129 Pittsburgh Apartment Buildings.
Bulletin 32. Corrosion of Wrought Iron, Cast Iron and Steel Pipe in House Drainage Systems. 8 x 10¾ in. 32 pp. Illustrated. Data obtained through investigations conducted in New York and Chicago by Dr. Wm. P. Gerhard, C.E., and Thomas J. Claffy, Asst. Chief San. Inspector, city of Chicago.
Bulletin 38. The Installation Cost of Pipe. 32 pp. 8 x 10¾ in. Illustrated. Cost analyses of 20 different pipe installations, in power and industrial plants, office buildings, hotels, residences, etc.

Clow & Sons, James B., 534 S. Franklin Street, Chicago, Ill.
Catalog "A." 4 x 6½ in. 706 pp. Illustrated. Shows a full line of steam, gas and water works supplies.

National Tube Co., Frick Building, Pittsburgh, Pa.
National Bulletin No. 11, History, Characteristics and Advantages of National Pipe. Catalog. 8½ x 11 in. 48 pp. Illustrated.

Reading Iron Company, Reading, Pa.
Reading Genuine Wrought Iron Pipe in the Making and in Service. Bulletin No. 1. 8½ x 11 in. 32 pp. Illustrated. History of the Reading Iron Company. Origin of wrought iron—description of each process of manufacture of both buttweld and lapweld pipe—Reading Pipe in various fields.
Book of Standards. Booklet. 5 x 7 in. 48 pp. Illustrated. Complete tables showing dimensions, tests and list prices on each of the 552 different kinds of Reading Tubular goods. Two simple tests for distinguishing genuine wrought iron pipe.
The Painted Molecule. Booklet. 4 x 9 in. 8 pp. Illustrated. A brief, non-technical description of the reasons for the longer life of Reading Iron Pipe, with instances of actual service.
The Ultimate Cost. Booklet. 5¼ x 7¼ in. 24 pp. Illustrated in two colors. A comparison in actual figures of the initial cost and the ultimate cost of plumbing and heating systems in several kinds of homes.

PLUMBING EQUIPMENT

American Brass Company, Waterbury, Conn.
Benedict Nickel. Illustrated pamphlet descriptive of Benedict Nickel White Metal for high-grade plumbing fixtures.

A. P. W. Paper Company, Albany, N. Y.
The Onliwon Cabinet and Paper. Booklet. 5½ x 3½ in. 24 pp. Illustrated. Contains descriptions, illustrations and specifications of cabinets for serving Onliwon toilet paper and Onliwon paper towels.

Bridgeport Brass Company, Bridgeport, Conn.
Plumbing Supplies. Booklet. 10½ x 8 in. 20 pp. Illustrated. Describes a few of the different plumbing supplies manufactured by the Bridgeport Brass Company.

SELECTED LIST OF MANUFACTURERS' PUBLICATIONS — *Continued from page 66*

PLUMBING EQUIPMENT—Continued

Brunswick-Balke-Collender Co., 623 S. Wabash Avenue, Chicago, Ill.
Whale-bone-ite Seat. Booklet. 3½ x 6¼ in. 4 pp. Illustrated.
Whale-bone-ite Seat. Booklet. 3½ x 6¼ in. 8 pp. Illustrated.

Clow & Sons, James B., 534 S. Franklin Street, Chicago, Ill.
Catalog "M." 9¼ x 12 in. 184 pp. Illustrated. Shows complete line of plumbing fixtures for Schools, Railroads and Industrial Plants.

Crane Company, 836 S. Michigan Avenue, Chicago, Ill.
Crane Products in World Wide Use. Catalog. 5 x 9½ in. 24 pp. Illustrated.
Plumbing Suggestions for Home Builders. Catalog. 3 x 6 in. 80 pp. Illustrated.
Plumbing Suggestions for Industrial Plants. Catalog. 4 x 6½ in. 43 pp. Illustrated.

Eljer Company, 15 E. Van Buren St., Chicago, Ill.
The Standardized Sixteen. Booklet. 3¼ x 6¾ in. 32 pp. Illustrated. Describes fully the complete Eljer line of standardized plumbing equipment, with diagrams, weights, measurements and copious illustrations.

Kohler Co., Kohler, Wis.
Catalog F. 7½ x 10⅝ in. 216 pp. Illustrates and describes the complete line of Kohler trade-marked plumbing ware.
Roughing-In Measurement Binder, 5 x 8 in., containing loose-leaf sheets on all staple fixtures.

Maddock's Sons Co., Thomas, Trenton, N. J.
Highest Grade Standardized Plumbing Fixtures for Every Need. Catalog. 5 x 7½ in. 94 pp. Illustrated. Covers the complete line.
Bathroom Individuality. Booklet. 6 x 9 in. 28 pp. Illustrated. Showing view of complete bathrooms with complete descriptions of floor plans.
Specifications for plumbing fixtures. Booklet. 9 x 12 in. 8 pp. Tables of specifications for industrial buildings, schools, apartments, hotels, etc.

Speakman Company, Wilmington, Del.
Speakman Showers and Fixtures. Catalog. 4½ x 7½ in. 250 pp. Illustrated. Catalog of Modern Showers and Brass Plumbing Fixtures, with drawings showing layouts, measurements, etc.
Toned Up In Ten Minutes. Booklet. 7½ x 10½ in. 16 pp. Illustrated. Modern Showers and Washups for Industrial Plants, showing the sanitary method of washing in running water.

Wolff Manufacturing Company, 255 No. Hoyne Ave., Chicago, Ill.
Plumbing Suggestions. Catalog. 3¼ x 6 in. 50 pp. Illustrated. Illustrating, describing and pricing Wolff Quality Plumbing Fixtures for residential installation.

PUMPS

Goulds Mfg. Co., The, Seneca Falls, N. Y.
Set of Twenty Bulletins. 7½ x 10½ in. 12 to 32 pp. each. Illustrated. Covers complete line of power and centrifugal pumps for all services.
Catalog "K." 6 x 9 in. 216 pp. Illustrated. Covers complete line of smaller size pumps.

RAMPS

Ramp Buildings Corporation, 115 Broad St., New York, N. Y.
The d'Humy Motoramp System of Building Design. Booklet. 8½ x 11 in. 20 pp. Illustrated. Describes the d'Humy system of ramp construction for garages, service buildings, factories, warehouses, etc., where it is desirable to drive motor vehicles or industrial tractors under their own power from floor to floor.
Storage Efficiency of Multi-Floor Garages. Leaflet. 8½ x 11 in. 4 pp. Illustrated. A brief discussion of comparative storage efficiencies of elevator garages, ordinary ramp garages, and d'Humy Motoramp garages.
Visibility. Pamphlet. 8½ x 11 in. 2 pp. Illustrated. Discussion of visibility feature of d'Humy Motoramp System with reference to illustration of one particular installation.
Series of Informal Bulletins on Garage Design. Sent upon request.

ROOFING

American Brass Company, Waterbury, Conn.
Copper Products for Roofing Purposes. Illustrated price-list devoted to copper products, including sheets and rolls, for fabricating into leaders, gutters, flashings, shingles, etc.

American Sheet & Tin Plate Co., Frick Bldg., Pittsburgh, Pa.
Better Buildings. Catalog. 8½ x 11 in. 32 pp. Describes Corrugated and Formed Sheet Steel Roofing and Siding Products, black, painted and galvanized, with directions for application of various patterns of Sheet Steel Roofing in various types of construction.
Copper—Its Effect Upon Steel for Roofing Tin. Catalog. 8½ x 11 in. 28 pp. Illustrated. Describes the merits of high grade roofing tin plates and the advantages of the copper-steel alloy.

Copper & Brass Research Assn., 25 Broadway, New York, N. Y.
Copper Roofing. Booklet. 8½ x 11 in. 32 pp. Illustrated. Gives information regarding weights of various roofing materials. Describes up-to-date practice and methods of laying copper roofs; decorative effects and how to obtain them. Gives specifications and details. Flashings, reglets, gutters and leaders, cornices and copper-covered walls.

Creo-Dipt Company, 1025 Oliver St., North Tonawanda, N. Y.
Architectural Service Sheets. 8½ x 11 in. Illustrated. Working drawings of construction, with standard specifications for design and construction of same.

Illinois Zinc Company, 280 Broadway, New York, N. Y.
Corrugated Sheets of Pure Rolled Zinc. Booklet. 3½ x 8½ in. 8 pp. Illustrated. Describes methods of application for Corrugated Zinc Sheets for roofing or siding. Weights per square. Comparative gauge lists.
The Roof That's Always New. Booklet. 3½ x 6 in. 12 pp. Illustrated. Story of Illinois Zinc Shingles, their everlasting and artistic qualities. Information regarding a complete zinc roof, shingles, starting piece, valley, ridge and hip piece.

ROOFING—Continued

Ruberoid Co., The (formerly the Standard Paint Co.), 95 Madison Avenue, New York, N. Y.
Instructions for Laying Built-up Roofs. Booklet. 8½ x 11 in. Illustrated.
Ruberoid Facts Worth Knowing. Booklet. 6 x 9 in. 16 pp. Illustrated.
Ruberoid Strip-shingle. Booklet. 3½ x 6¼ in. 16 pp. Illustrated in color.
Ruberoid Unit-shingle. Booklet. 3½ x 6¼ in. Illustrated in color.

N. & G. Taylor Company, 300 Chestnut Street, Philadelphia, Pa.
Selling Arguments for Tin Roofing. Booklet. 6¼ x 9¼ in. 80 pp. Illustrated. Describes the various advantages of the use of high grade roofing tin, gives standard specifications, general instructions for the use of roofing tin, illustrates in detail methods of application.

SAFETY TREADS

Universal Safety Tread Co., 40 Court St., Boston, Mass.
The Universal Safety Metal Tread. Booklet. 8½ x 11 in. 16 pp. Illustrated. Describes Safety Treads, with lead inserts in steel base, suitable for use on iron, wood or concrete stairs. Also the flat type, with "Alundum" surface, as well as special ladder treads for ships, power-house and engine-room open string stairways.

SEWAGE DISPOSAL

Kewanee Private Utilities, 442 Franklin St., Kewanee, Ill.
Specification Sheets. 7¾ x 10¼ in. 46 pp. Illustrated. Detailed drawings and specifications covering water supply and sewage disposal systems.

SHEATHING

Bishopric Manufacturing Co., 103 Este Ave., Cincinnati, Ohio
For All Time and Clime. Booklet. 6 x 9 in. 48 pp. Illustrated. Describing the use of Bishopric stucco base and Bishopric plaster base.

STEEL DRESSERS

Janes & Kirtland, 133–135 West 44th St., New York, N. Y.
The White House Line. Booklet. 7¾ x 5¼ in. 24 pp. Illustrated. Describes and illustrates in detail WHITE HOUSE Steel Dressers and some of the separate units. Also contains typical layout and list of some of our clients.
Photographs. 5½ x 3½ in. Views of actual installations in private residences, schools, etc., sent on request.

STONE, BUILDING

Harrison Granite Company, 200 Fifth Avenue, New York, N. Y.
Harrison Granite Company, Clientele. 3¾ x 8¾ in. 24 pp. Illustrated. A partial list of clients with illustrations of examples of monuments and mausoleums.

Indiana Limestone Quarrymen's Association, Box 766, Bedford, Indiana.
Volume 3. Series A-3. Standard Specifications for Cut Indiana Limestone work. 8½ x 11 in. 56 pp. Containing specifications and supplementary data relating to the best methods of specifying and using this stone for all building purposes.
Vol. 1. Series B. Indiana Limestone Library. 6 x 9 in. 36 pp. Illustrated. Giving general information regarding Indiana Limestone, its physical characteristics, etc.
Vol. 27. Series B. Designs for Houses of Indiana Limestone. 8½ x 11 in. 32 pp. Illustrated. Being the best designs submitted in competition for a detached residence faced with Indiana Limestone conducted by *The Architectural Review*.
Volume 4, Series "B." Booklet. 8½ x 11 in. 64 pp. Illustrated. Indiana Limestone as used in Banks.

Tompkins-Kiel Marble Company, 505 Fifth Ave., New York, N. Y.
Reproductions in natural colors of imported and domestic marbles and stone for interior and exterior uses.
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Brasco Manufacturing Company, 5025 So. Wabash Ave., Chicago, Ill.
Brasco Catalog No. 26. 8½ x 11 in. 28 pp. Illustrated. Catalog illustrating and describing members of the Brasco and Brasco-Hester Construction. Includes copper-covered Brasco moulding and the Hester all metal moulding. The wood core of the Brasco has been creosoted and will last as long as the building.
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Full-Size Details Brasco-Hester Copper Store Front Construction. 8¾ x 11 in. This type is all metal or hollow. Has a dust regulator at the base of the plate which does not stick.

Kawneer Co., The, Niles, Mich.
A Collection of Successful Designs. Catalog. 9¼ x 6½ in. 64 pp. Illustrated. Showing by use of drawings and photographs many types of Kawneer Solid Copper Store Fronts.

Zouri Drawn Metals Co., B. J. 10, Chicago Heights, Ill.
Architects' Catalog. 8¾ x 11¾ in. 86 pp. Illustrated. Showing a true copy of the approval of the Underwriters' Laboratories. Showing a proper glazing specification, based on the Underwriters' Report.
Catalog B. J. 8. 6 x 9 in. 68 pp. Illustrated. Key to Getting the People In.

SELECTED LIST OF MANUFACTURERS' PUBLICATIONS — *Continued from page 67*

STUCCO BASES

Bishopric Manufacturing Co., 103 Este Ave., Cincinnati, Ohio.
For All Time and Clime. Booklet. 6 x 9 in. 48 pp. Illustrated. Describing the use of Bishopric stucco base and Bishopric plaster base.

STUCCO, MAGNESITE

American Magnestone Corporation, Springfield, Ill.
Catalog. 13 pp. Describes the quality, beauty and strength of Magnestone.
American Materials Company, 101 Park Avenue, New York; Weed Street and Sheffield Avenue, Chicago, Ill.
Elastica, the Stucco of Permanent Beauty. Catalog. 8½ x 11 in. 32 pp. Illustrated. Treatise on composition and application of Elastica Stucco.
Muller & Co., Franklyn R., Waukegan, Ill.
Everlastic Magnesite Stucco. Booklet. 8½ x 11 in.
United States Materials Co., Weed Street and Sheffield Avenue, Chicago, Ill. See American Materials Co.

TELEPHONE SYSTEMS

Federal Telephone & Telegraph Company, 1738 Elmwood Ave., Buffalo, N. Y.
Catalog No. 610. Booklet. 8½ x 10 in. 24 pp. Illustrated. Interior telephones for home, office, factory, hotel and apartment-house use.

TERRA COTTA

Atlantic Terra Cotta Co., 1170 Broadway, New York, N. Y.
Questions Answered. Booklet, 7½ x 5¼ in. 32 pp. Illustrated. A synopsis of questions most frequently asked by architects in relation to terra cotta, with brief but complete answers; contains many illustrations.
National Terra Cotta Society, 1 Madison Avenue, New York, N. Y.
Standard Construction, Indexed, bound volume. 10½ x 16 in. 90 pp. 70 Illustrations. Standard forms of terra cotta construction with short article.
"The School." 10½ x 13½ in. 34 pp. 92 Illustrations. Types of school buildings with short descriptive articles. Volume I, brochure series.
"Better Banks." 10½ x 13½ in. Illustrated. Banks of various sizes, with short descriptive articles.
"Terra Cotta Defined." 10½ x 13½ in. Complete description of Terra Cotta and its uses.
The New Jersey Terra Cotta Co., Singer Bldg., New York, N. Y.
Store Fronts in Architectural Terra Cotta. Booklet. 8½ x 11 in. 44 pp. Illustrated. Photographs, measured drawings, designs and illustrations of decorative motifs make up an interesting booklet which will be forwarded upon request.
Northwestern Terra Cotta Co., The, 2525 Clybourn Ave., Chicago, Ill.
Booklet. 8¼ x 11 in. 77 pp. Illustrated. Showing in a concise way the usefulness of terra cotta.

THERMOSTATS—See Heating Equipment

TILE, FLOOR AND WALL

Associated Tile Manufacturers, The, Beaver Falls, Pa.
Bring the Crowds to Your Market. Booklet. 8½ x 11 in. 16 pp. Illustrated. The use of Tile for the modern sanitary market.
Swimming Pools. Booklet. 8½ x 11 in. 32 pp. Illustrated. A handbook on swimming pools and their construction.

TILE, HOLLOW

Hollow Building Tile Association, Dept. 1812, Conway Bldg., Chicago, Ill.
Handbook of Hollow Building Tile Construction. 8½ x 11 in. 104 pp. Illustrated. Complete treatise on most approved methods of hollow tile building construction and fireproofing.
National Fire Proofing Co., 250 Federal St., Pittsburgh, Pa.
Standard Wall Construction Bulletin 174. 8½ x 11 in. 32 pp. Illustrated. A treatise on the subject of hollow tile wall construction.
Industrial Housing Bulletin 172. 8½ x 11 in. 14 pp. Illustrated. Photographs and floor plans of typical workingmen's homes.
Natco on the Farm. 8½ x 11 in. 38 pp. Illustrated. A treatise on the subject of fire safe and permanent farm building construction.
Fireproof Buildings of Natco Hollow Tile. Booklet. 8½ x 11 in. 16 pp. Illustrated. Showing the use of Natco Hollow Tile for private residences.

VALVES

Crane Co., 836 S. Michigan Ave., Chicago, Ill.
No. 50 Steam Pocket Catalog. 4 x 6¼ in. 775 pp. Illustrated. Describes the complete line of the Crane Co.
Jenkins Bros., 80 White Street, New York.
The Valve Behind a Good Heating System. Booklet. 4¼ x 7¼ in. 16 pp. Color plates. Description of Jenkins Radiator Valves for steam and hot water, and brass valves used as boiler connections.
Jenkins Valves for Plumbing Service. Booklet. 4¼ x 7¼ in. 16 pp. Illustrated. Description of Jenkins Brass Globe, Angle Check and Gate Valves commonly used in home plumbing, and Iron Body Valves used for larger plumbing installations.

VENETIAN BLINDS

Burlington Venetian Blind Co., Burlington, Vt.
Venetian Blinds. Booklet. 4½ x 7½ in. 32 pp. Illustrated. Describes the "Burlington" Venetian blinds, method of operation, advantages of installation to obtain perfect control of light in the room.

VENTILATION

Clarage Fan Company, Kalamazoo, Mich.
Catalog No. 52. 8½ x 11 in. 84 pp. Illustrated. Describes Clarage Kalamazoo Multiblade Fans and Heaters for use in schools, churches, hospitals and industrial plants. Engineering data, capacity tables and dimensions included.

WALL BOARDS

Carey Co., The Philip, Cincinnati, Ohio.
Carey Board for Better Building. Catalog. 6 x 9 in. 32 pp. Illustrated.
United States Gypsum Company, 205 West Monroe St., Chicago, Ill.
Walls of Worth. Booklet. 8½ x 11 in. 24 pp. Illustrated. Describes Sheetrock, the fireproof wall board, its advantages and uses.

WATERPROOFING

Ruberoid Co., The, 95 Madison Ave., N. Y.
Impervite. Circular. 8½ x 11 in. 4 pp. Illustrated. An integral waterproofing compound for concrete, stucco, cement, mortar, etc.
Sandusky Cement Co., Dept. F., Cleveland, Ohio.
Medusa Waterproofing. Booklet. 6¾ x 9 in. 38 pp. Illustrated.
The Truscon Laboratories, Detroit, Mich.
Science and Practice of Integral Waterproofing. 4 x 9 in. 32 pp. Illustrated. Discusses why concrete requires waterproofing and properties an integral waterproofing must possess. Full specifications for waterproofing mass concrete, cement stucco and cement plaster coat.

WATER PURIFIERS

Wallace & Tiernan Company, Newark, N. J.
Protecting N. Y. Water Supply. Booklet. 10 x 7 in. 24 pp. Illustrated. Describes the chlorinating equipment used for sterilising N. Y. City water supply; also equipment suitable for sterilising water supplies of municipalities, industrial plants, private residences, etc.

WATER SOFTENERS

Permutit Company, The, 440 Fourth Ave., New York, N. Y.
Permutit-Water softened to No (Zero) Hardness. Booklet. 8½ x 11 in. 32 pp. Describing the original Zeolite process of softening water to zero hardness. An essential for homes, hotels, apartment houses, swimming pools, laundries, textile mills, paper mills, ice plants, etc., in hard water districts.

WINDOW HARDWARE

American Chain Company, Inc., Bridgeport, Conn.
American Sash Chain. Booklet. 3½ x 6 in. 8 pp. Illustrated. Describes and illustrates American Sash Chain and Sash Fixtures.
The Kawneer Company, Niles, Mich.
Kawneer Simplex Windows. Catalog. 8½ x 10½ in. 16 pp. Illustrated. Complete information, with measured details, of Kawneer Simplex Weightless Reversible Window Fixtures, made of solid bronze. Shows installations in residences and buildings of all sorts. Detail Sheets and Installation Instructions. Valuable for architects and builders.
Samson Cordage Works, Boston, Mass.
Catalog. 3½ x 6¼ in. 24 pp. Illustrated. Covers complete line.
Smith & Egge Mfg. Co., The, Bridgeport, Conn.
Booklet. 6¾ x 9 in. 42 pp. Illustrated. Covers a complete line of chains, hardware and specialties.

WINDOWS, CASEMENT

Crittall Casement Window Co., 2703 East Atwater Street, Detroit, Mich.
Catalog No. 18. 9 x 12 in. 56 pp. Illustrated.
Hoffman Mfg. Co., Andrew, 900 Steger Building, Chicago, Ill.
Hoffman Casements. Architects' Portfolio. 8½ x 11 in. Loose-leaf. Large scale working details for mill-work and installation.
F. S. Details 20 x 23 in. and 15 x 22 in. Working details for mill-work and installation.
Hoffman Casements Catalogue. 7 x 8½ in. 16 pp. Illustrated.
Hope & Sons, Henry, 103 Park Avenue, New York.
Catalog. 12¼ x 18½ in. 30 pp. Illustrated. Full size details of outward and inward opening casements.
International Casement Company, Jamestown, N. Y.
International Casements. Catalog. 8½ x 11 in. 224 pp. Illustrated. Valuable book, containing photographs and measured drawings of all types of buildings, showing casement windows.
David Lupton's Sons Co., Allegheny Ave. and Tulip St., Philadelphia, Pa.
Lupton Service—Products No. 11. Book. 8½ x 11 in. 192 pp. Illustrated. The full line of Lupton products described and illustrated. Separate chapter on Designing Service. Many new types of steel sash for apartments, hotels, etc., shown.
Catalog No. 110. 8½ x 11 in. 72 pp. Illustrated. A condensed version of the No. 11 or general catalog. The new Lupton Projected Sash completely described.
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Page Steel & Wire Company, Bridgeport, Conn.
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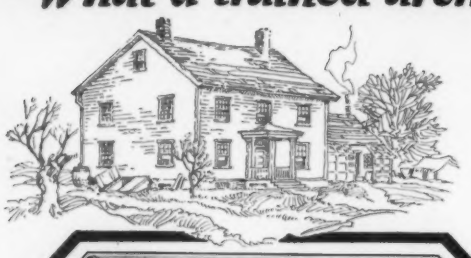

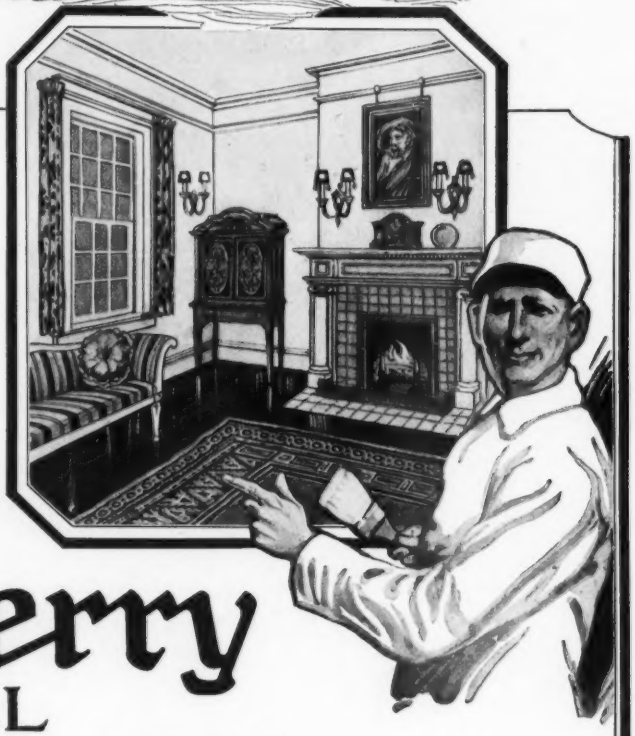

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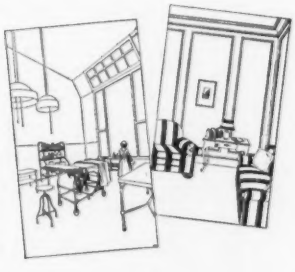

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Sanitary — A covering of material which will provide a hard, compact, smooth and non-porous surface film that is free from pulp, paste and all other absorbent tissues which decay, gather dust and provide lodging places for bacteria and other germ breeding growths.

Washable — Where immaculate cleanliness is maintained at all times as it is in the modern hospital, it is vitally important that the wall covering be one that is not only dust and dirt resisting but one that can be washed repeatedly without danger of having it crack, chip, peel or fade.

Durable — The annoyance of frequent refinishing is very disturbing not only to those in charge of the hospital but also to the patients. It therefore behooves you, the architect, to select a wall covering which will last more than two or three years without refinishing.

Economical — In specifying wall coverings for hospital use it is important that those used represent the economy of quality, not the false economy of price. Even where ordinary circumstances seem to indicate the use of wall paper, water colors, kalsomine or other inferior wall coverings, economic and hygienic reasons should forbid their application.

Cheerful — The atmosphere of the hospital should, above all, be cheerful. The wall coverings should be plain and free from spotted and "crawly" patterns or designs which have a tendency to create unrest in the mind of the patient.

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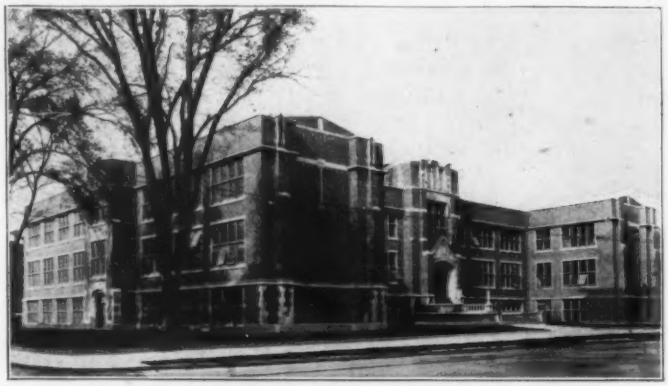

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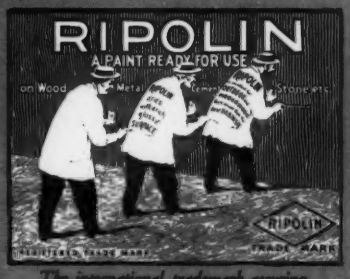

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Mary Imogene Bassett Hospital,
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Architect: F. P. Whiting.

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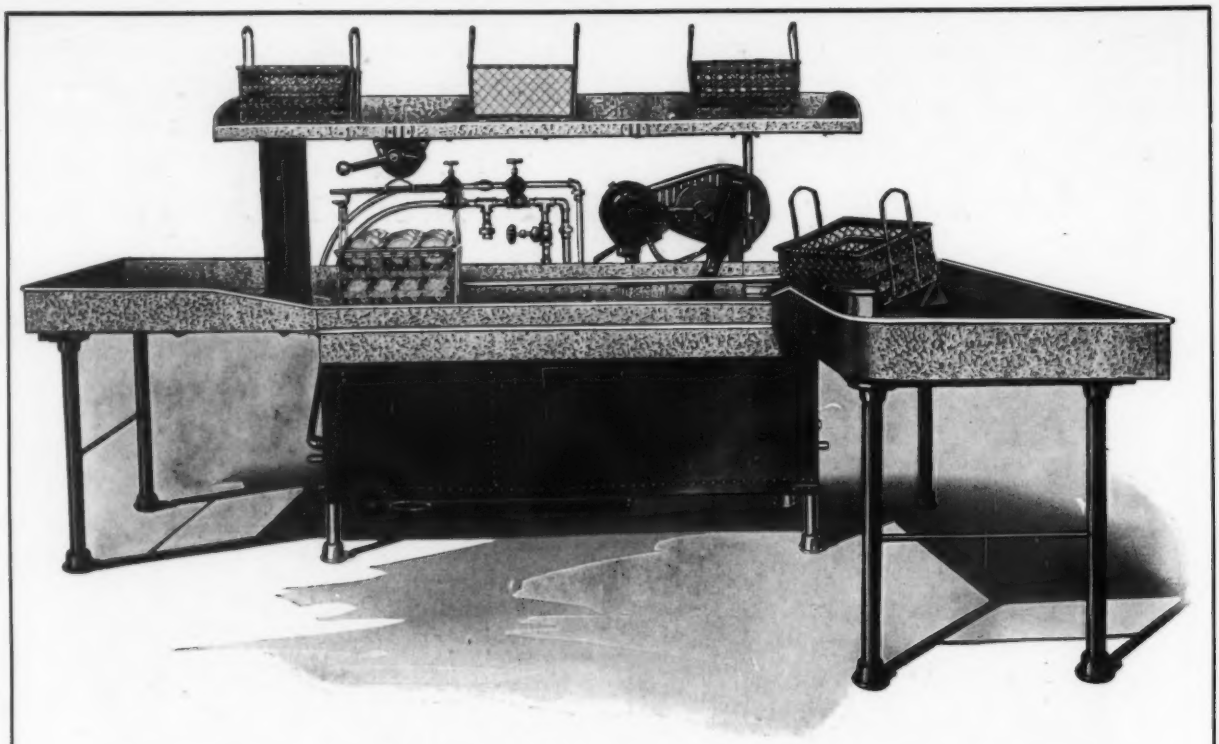

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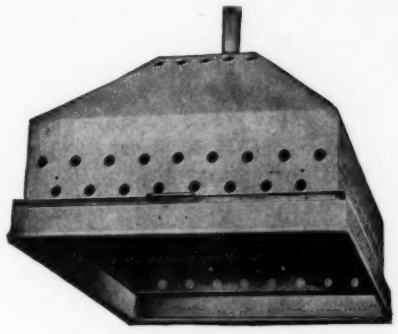
The hardest problems in hospital lighting solved



Frink Operating Table Reflector

Another problem in hospital lighting is the operating table. On this must be concentrated an intense illumination accomplished *without* a corresponding increase of heat.

Frink Operating Table Reflectors are now being used by the majority of the first class hospitals in the country. They throw on the table a light of over 50 foot-candles, yet so effective is the automatic ventilating features that the temperature *at the lower plate* is not more than 8 degrees above that of the room, after an hour's operation.

ORDINARY "indirect" lighting often leaves a glaring spot over the fixture that is only less irritating to the weakened eyes of patients than a directly exposed source of light.

The Frink System of Hospital Lighting includes ward lights so designed as to distribute evenly diffused light over a large area of the ceiling and whence it is redirected and *really* diffused throughout the room. The result is an ample, yet soft and restful, light.

Catalog 421 describes fully the various types of this and other Frink units for the scientific illumination of the modern hospital, including:

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Frink Dustless Ward Reflectors
Frink Microscopic Reflectors
Frink Night Floor Lights
Frink Operating Table Reflectors

Frink Lighting Systems are features of such splendid hospitals, large and small, as:

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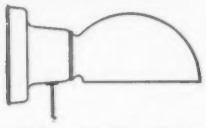
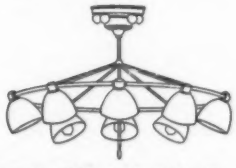


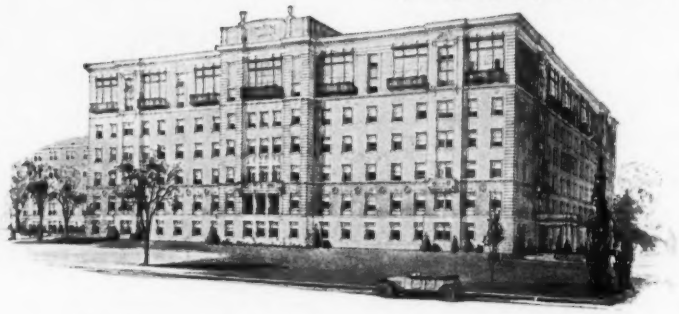
AGLITE—Special all-glass bracket fixtures—used on the walls of bedrooms.

Special porcelain enameled flange fixture with Monax Urns for bedroom ceilings.

Corridors are lighted with these special Opal Ball fixtures equipped with signal and service lights.



Scanlan-Morris Noshadowlite—made in Brascolite factory—for direct illumination over operating tables. These fixtures are also used in the Mayo Clinic Building



New surgical pavilion of St. Mary's Hospital, Rochester, Minn. Architect: Clarence H. Johnston (State Architect), St. Paul, Minn. Contractors: Heffron & Fitzgerald, Rochester, Minn. Electrical Contractors: Rochester Electric Co., Rochester, Minn.

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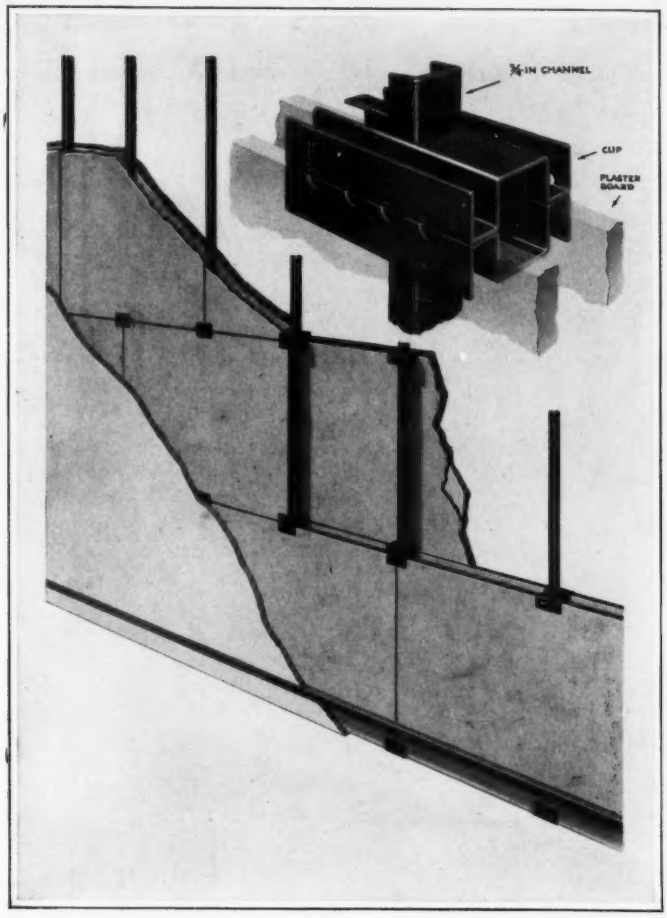

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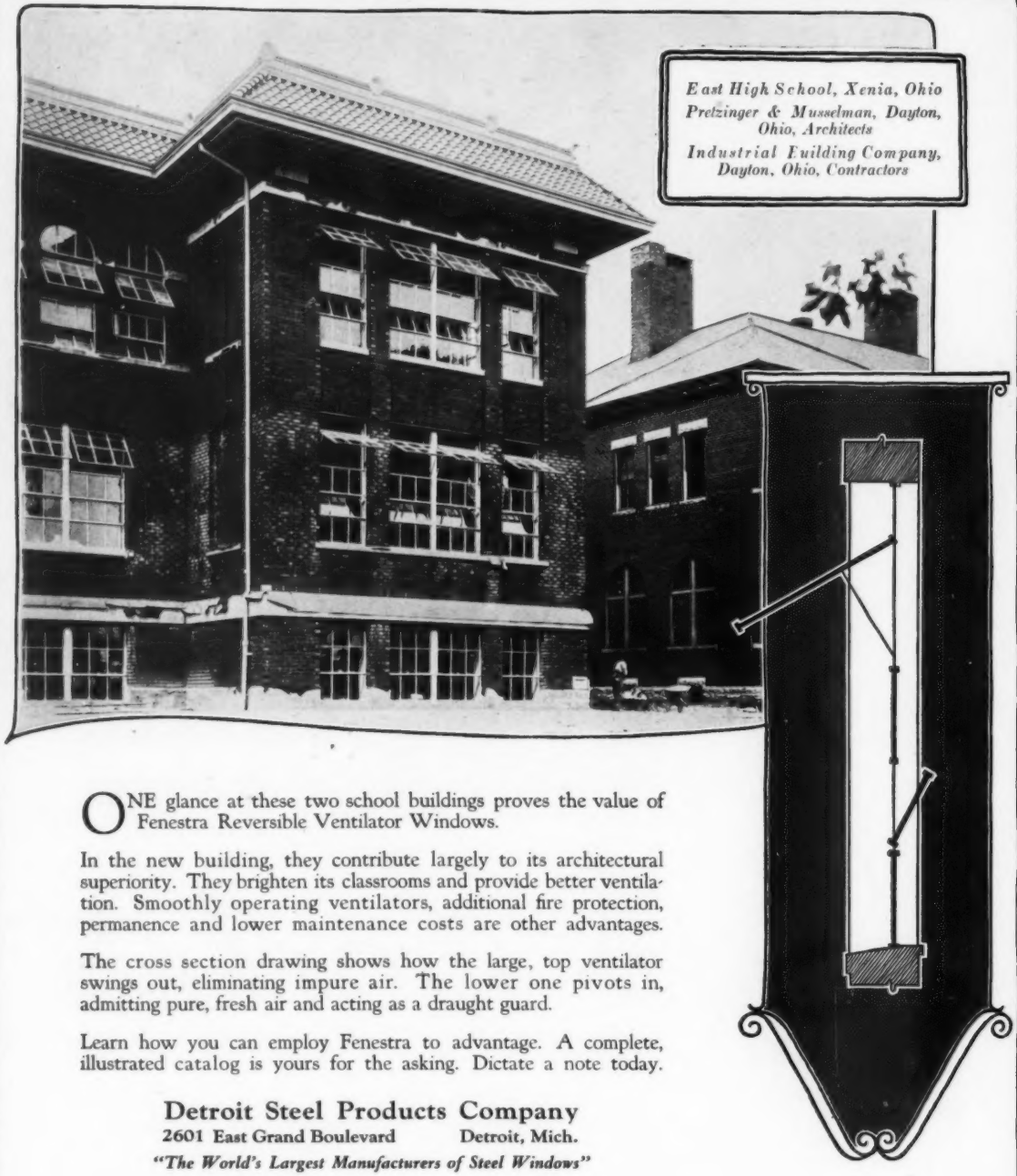

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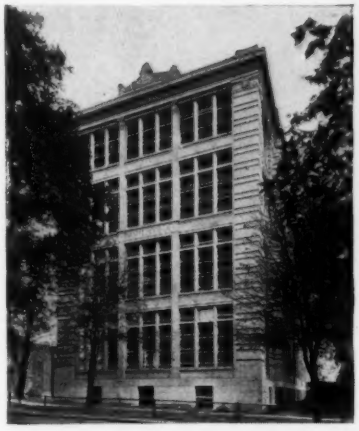
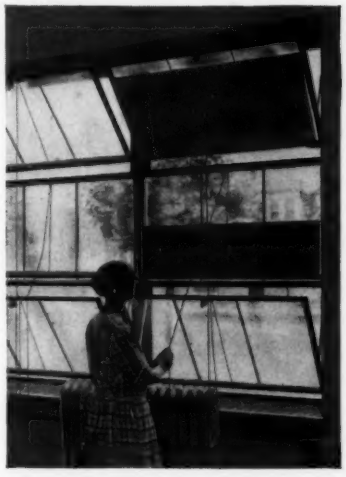
Lupton Projected Sash (special) in Akron City Hospital, Akron, O.

F. W. Striebinger Architect





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The ventilators are balanced and held by friction at any degree of opening. By reversing them they can be washed from inside. They fit closely when shut, and do not rattle.

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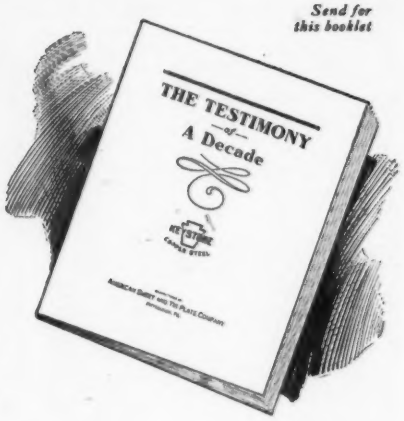

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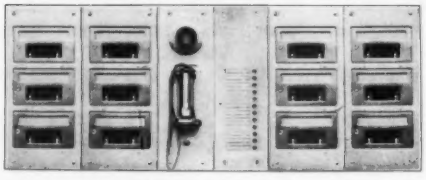

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For Modern Apartment Houses

These up-to-date equipments contribute much to the appearance of an apartment house vestibule. Every instrument is fitted with commercial standard apparatus of the same high quality as used on our public service exchange telephones.

There are various styles of Stromberg-Carlson apartment house systems designed for dwellings of all sizes and types.

Write our nearest office for Bulletin No. 15 containing prices, etc.

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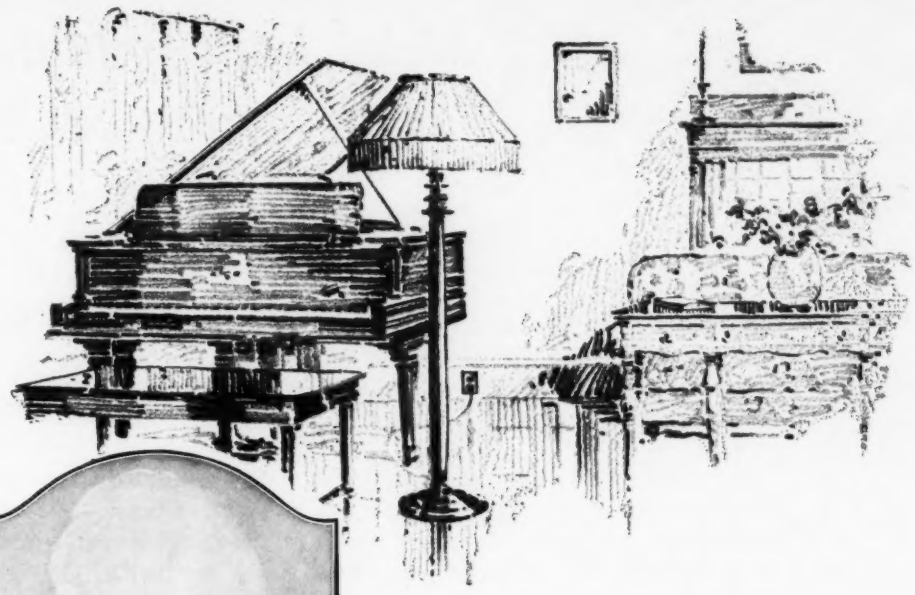

Suburban home equipped throughout with G-E Wiring Devices, Schenectady, N. Y., David Lockerby, Architect

G-E National Advertising to prospective home builders is creating a new appreciation of the comforts of a completely wired home—stimulating desire for added refinements.

Convenience Without Sacrificing Beauty

THE modern architect is called upon to provide maximum convenience and still preserve beauty of interior. The G-E Twin Convenience Outlet helps him to do both.

This double outlet facilitates the use of decorative lamps and eliminates the necessity of long connecting cords from wall or ceiling fixtures. Thus the beauty of any room is retained as it was originally designed.

To satisfy the client's desire for plenty of outlets, the architect should plan accordingly and make allowance for an increasing use of electricity. With G-E Twin Convenience Outlets in every room, the usefulness of the wiring installation is doubled without sacrifice of artistic effect by overcrowding outlets.

G-E RELIABLE WIRING DEVICES
can be furnished by any qualified electrical contractor

For information address
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General Electric Company

General Office Schenectady, N.Y.

Sales Offices in all large cities

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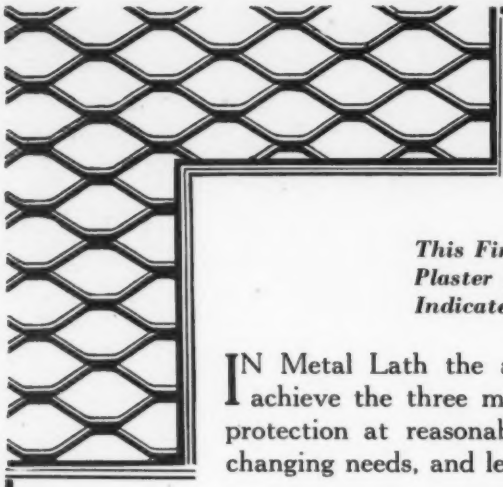

Metal Lath Important Factor in Hospital Building

This Fire-Retardant, Crack-Preventing Plaster Base and Reinforcing Logically Indicated in Large and Small Work

IN Metal Lath the architect has a material which helps him to achieve the three main present-day Hospital requirements,—fire protection at reasonable cost, greater flexibility in anticipation of changing needs, and lessened up-keep.

In the larger structures, subdivision of the building into fire units is made possible *economically* by using Metal Lath under non-combustible plaster, in ceilings and all interior non-bearing walls, and all areas where fire might originate,—boiler and storage rooms, etc. In small communities the safety of the frame hospital is vastly heightened by using the steel mesh under exterior stucco, interior plastering and, of course, for fire-stopping and rat-proofing. In *any* structure

Kno-Burn
METAL LATH
"The Steel Heart of Plaster"

is a guarantee of minimum repair bills—that needed changes can be made easily and inexpensively and of added fire protection.

Nationally specified for suspended ceilings

SUSPENDED CEILINGS in these two Hospitals—(above) Masonic Hospital, St. Louis, Architect, F. C. Bonsack; (below) Mt. Sinai Hospital, Cleveland, Architects, George B. Post & Sons—were constructed with KNO-BURN lath.

Most architects are very familiar with the economical, small diamond meshed *Kno-Burn* lath, but it is always a pleasure to send—

Samples, Reports of Underwriters' Tests (Showing the One-Hour Fire Rating), Specifications, Free!

NORTH EXPANDED WESTERN METAL CO.

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Assures Crack Free and "Sound-Proof" Walls

Efficiency of the Economical, Space-Saving, 2" Metal Lath and Plaster Partition Scientifically and Practically Proven

THE University of Illinois' test, which so convincingly demonstrated the sound-proofing superiority of the 2" Metal Lath and Plaster Partition over the other four types of construction tested (see diagram), are substantiated in actual practice thus:

RESULT OF SCIENTISTS' TESTS

Note that the relative intensity of transmitted sound through the Metal Lath and Plaster Partition was but 0.93

Architect's Endorsement Col. George Metzger of Buffalo, Architect for the Memorial Hospital there erected in '98 in which these Metal Lath and Plaster Partitions were specified, says, "*The walls in this hospital do not show any cracks and are perfectly sound proof as well as fireproof.*" Supt. Duchmann of this building (one of the thousands in which

Kno-Burn METAL LATH

"The Steel Heart of Plaster"

After 24 years has been used) adds, "*We find these partitions very satisfactory—sound proof, crack proof and space saving.*"

Because of the increasing use of the 2" partition, leading manufacturers of electrical goods are now making a line of shallow equipment especially suited for this type of construction.

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Manufacturers of KNO-BURN, Eureka, XXth Century, Chanelath, Longspan, Kno-Fur, etc., etc.

Distributors in All Principal Cities

When some years since it was necessary to cut a doorway in one of the Metal Lath and Plaster Partitions of the Memorial Hospital, Buffalo, here shown, they simply sawed through the wall and moved the piece intact

Two brochures published in the interests of Architects and Engineers

Holtzer-Cabot

Signaling and Protective Systems

For Hospitals, Industrial Buildings, Hotels, Schools, Factories, etc.

The Holtzer-Cabot reputation of forty years successful manufacture of electrical equipment is a very real protection.

The leading Architects and Engineers of the country have always recognized this 100% efficiency.

Holtzer-Cabot installations are remarkable for many original features which are absolutely exclusive.

Simplicity, accessibility and low cost of maintenance are reasons why Holtzer-Cabot systems are a valuable investment.

In specifying Holtzer-Cabot products, you are specifying service over an indefinitely prolonged period—a period where up-keep is reduced to a minimum and where service is increased to a maximum.

Architects and engineers are invited to write for the brochures illustrated above which give detailed information of the types of signal systems we make.

The Holtzer-Cabot Electric Co.

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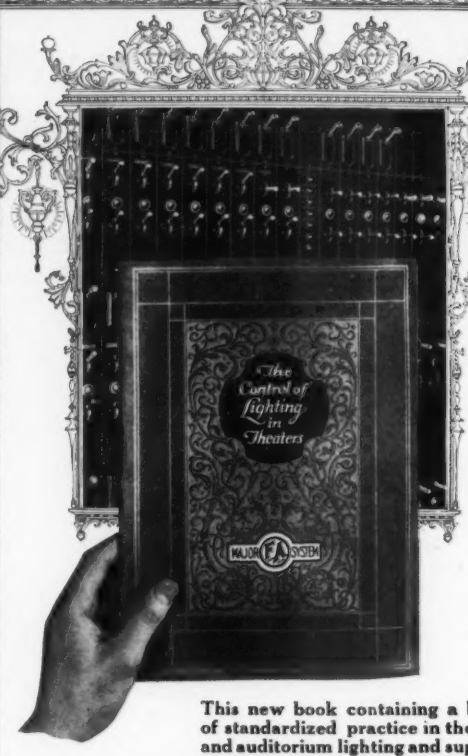

This new book containing a basis of standardized practice in theater and auditorium lighting and supplying blue print charts, complete specifications and a great fund of useful information, will be sent free of charge to every architect and specification writer who works on buildings of this type.

Theaters Schools Masonic Buildings Auditoriums

Need the Major System of Lighting Control

For the first time a system of lighting control has been worked out to handle adequately the lights for performances, entertainments and all manner of stage expositions. The Major System, of sectional unit construction, and containing the most flexible and simplest method of grouping controls, is capable of fulfilling every lighting control need in the smallest school building, as well as in the largest and most luxuriously equipped theater. Its cost is below that of inferior equipment, and the safety factors which it affords make it unquestionably the selection of far-seeing architects and contractors working on above types of buildings.

The story is fully told in the Major Book, "The Control of Lighting in Theaters," sent on request.

Frank Adam

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Triumph Line of Safety Type, Standardized Panel Boards and Cabinets; knife switches; safety switches; hanger outlets; reversible-cover floor boxes; A. C. and D. C. Distribution Switchboards.

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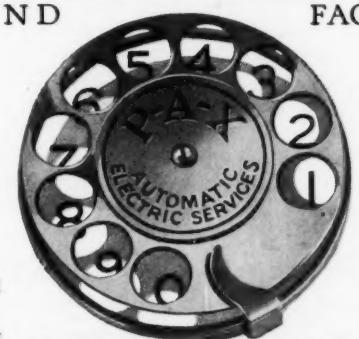

The Automatic Electric Services of the P-A-X combine inter-communication, code call system, conference wire, emergency alarms, watchman's calls and other related services.
The P-A-X augments and completes but does not supplant nor connect with local and long distance telephone service.

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Westinghouse has developed Safety Panel Board and Safety Switch specialists, whose duties, in brief, are (1) to *give specialized, reliable information on all switch, panel board and fuse panel problems;* (2) to *provide literature* on the subject, and (3) to *present Standard Specifications.*

"Cash in" on this opportunity for free, specialized switch counsel. See the nearest Westinghouse dealer or write to the address below.

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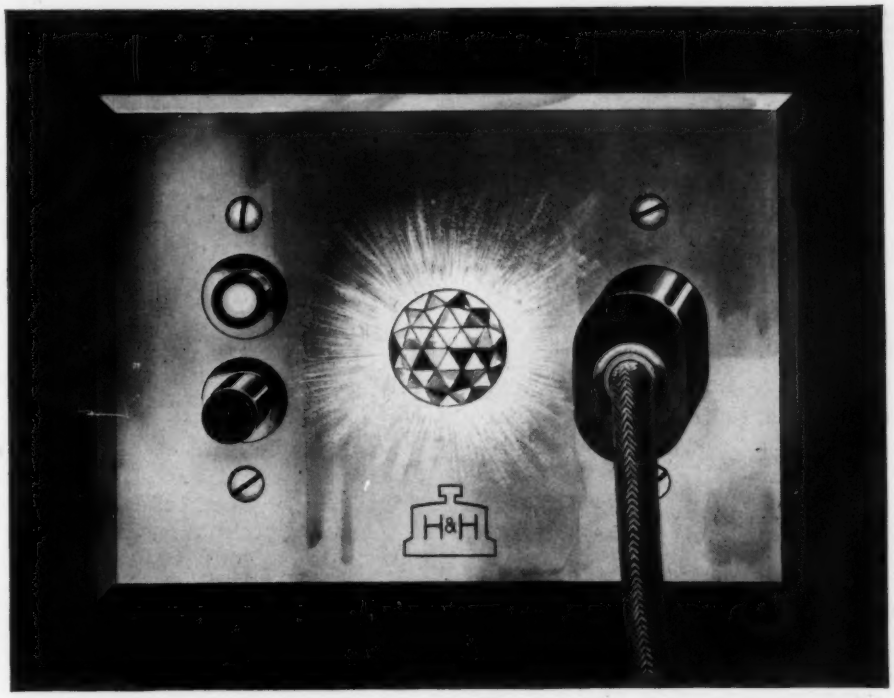
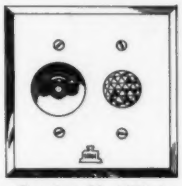


Current "on" or "off"—*told at a glance*



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Many heating and other electrical appliances do not visibly indicate when current is on. Users forget they did not turn off the current. And the only reminder is that which comes too late—the odor of burning insulation. Many times such occurences result not merely in the destruction of the heating appliance. Serious fires are started, endangering life and property.

Everywhere electric appliances are used—and especially in public institutions where absolute safety should be paramount—foresight and caution suggest that the use of "H & H" Warning Lights be provided for in plans for new buildings or electrical improvements.

Wonderfully Convenient for Hospital Service

When the current is "on", a candelabra lamp gleams through the ruby, cut-glass bulls-eye, a warning signal that the current is ON, and, if not needed, should be turned off. Location of lamp is clearly shown in illustration at left of this paragraph. Hinged base permits easy lamp replacement.

"H & H" Warning Lights are largely used not only in connection with outlets for heating appliances, but also in circuits feeding lights which, because located in out-of-the-way places, might be left burning unnoticed; and on circuits controlling stationary vacuum cleaners.

Available in many combinations with switches and receptacles of various types, and in the usual ampere capacities and voltage ratings.

The Hart & Hegeman Mfg. Co.

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H&H

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It is true that the damage that these leaks cause can usually be prevented by repacking the valves every year.

But there is a safer and more economical way to give real protection from leaks.

When IDEAL PACKLESS VALVES are installed, leaks are a thing of the past. The metal bellows (shown below) is tight, and steam, water or even air cannot pass it. This ends expensive repair work forever.

You wouldn't specify a roofing that you knew would leak. And no architect would knowingly specify a valve that will leak.

That is one of the reasons why so many architects are now specifying IDEAL PACKLESS VALVES exclusively.

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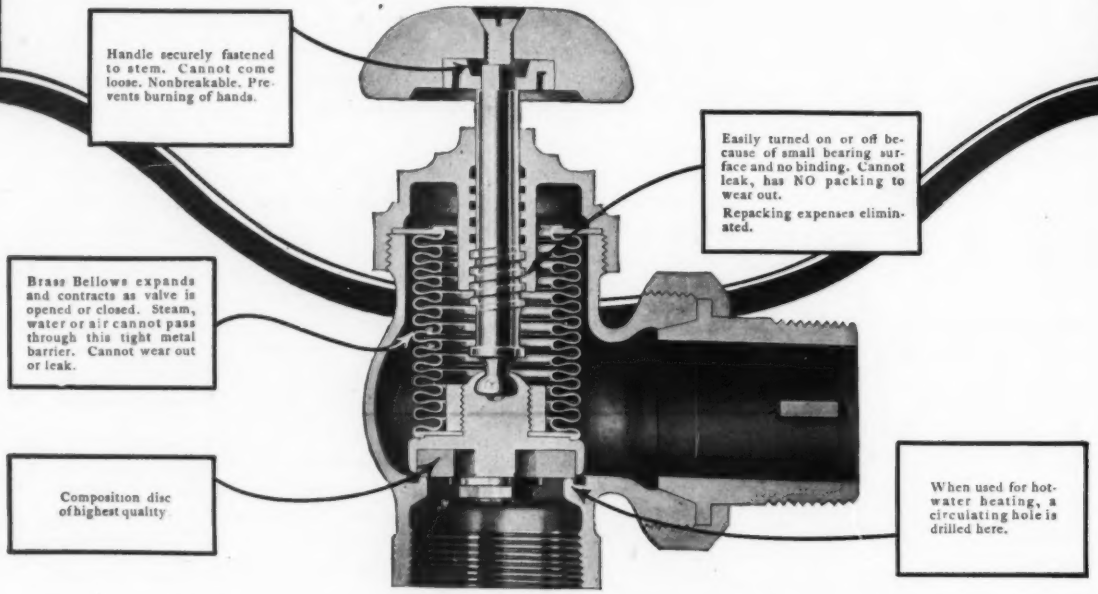
But even with all these advantages the IDEAL PACKLESS VALVE—developed by the American Radiator Company—costs very little more than the cheapest valve.

You can get IDEAL PACKLESS VALVES from any Heating Contractor or from the nearest Branch of this Company.


Handle securely fastened to stem. Cannot come loose. Nonbreakable. Prevents burning of hands.
Easily turned on or off because of small bearing surface and no binding. Cannot leak, has NO packing to wear out.
Repacking expenses eliminated.
Brass Bellows expands and contracts as valve is opened or closed. Steam, water or air cannot pass through this tight metal barrier. Cannot wear out or leak.
Composition disc of highest quality
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IDEAL Boilers and AMERICAN Radiators for every heating need

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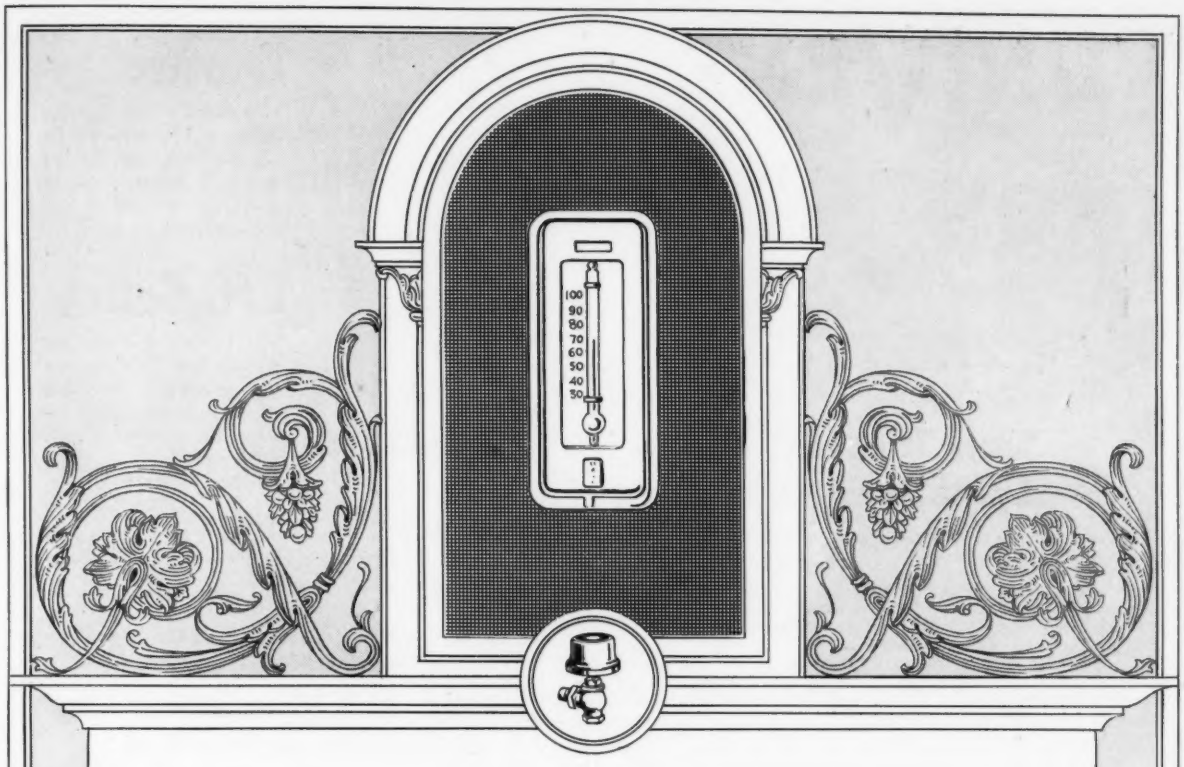

THERE are an ample number of hospitals to vouch for the advantages and perfect service being rendered by *The Johnson Pneumatic System of Temperature Regulation.* When it is said that a fuel saving of from 15 to 50 per cent is accomplished, even without all the other features distinctly favorable to hospitals, sufficient reason right now is given as to its merits and the pressing advisability of its installation. *Johnson Automatic Regulation* means so very much to hospital maintenance and costs so comparatively little that it unhesitatingly should be installed in every hospital: contemplated, in course of construction or already erected. . . . . .

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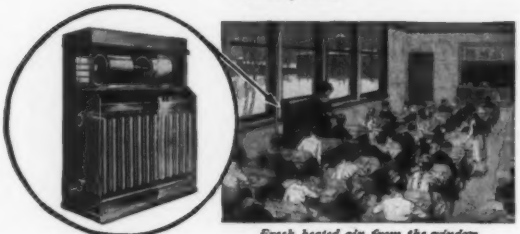

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Your ideal of perfect ventilation is all the fresh air you want, when you want it, where you want it.

Your ideal is realized perfectly in the Univent—because in principle it is as simple and more positive than opening a window—but without the cold and dangerous draft.

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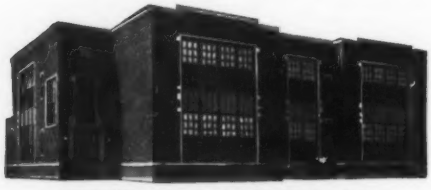

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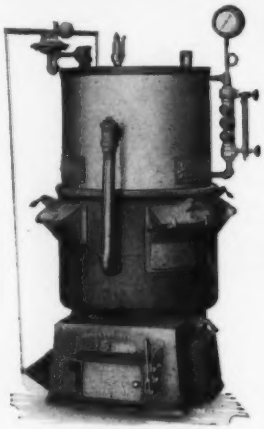

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The **Gorton Self-Feeding Boilers** are built on the lines of Power Boilers, using the same material, thus securing the greatest Strength, Durability, and highest Efficiency.

The **Gorton Self-Feeding Boiler** gives a steady heat with attention only morning and night; its construction insures complete combustion of the gases and prevents the waste of coal.

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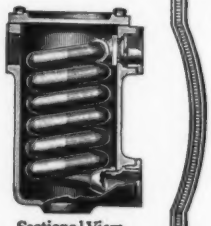
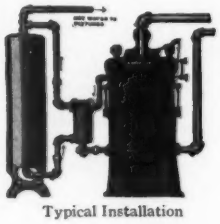


Sectional View



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IN the hospital wherever water must be delivered at a predetermined temperature and pressure it is not only essential but vitally necessary that the temperature and pressure be accurately controlled.

The whole thought behind each "Leonard" valve is: "It must live up to a promise."

Every "Leonard" Thermostatic Water Mixing Valve is built on honor, sold on honor and must perform its function in an honorable manner under the most severe working conditions. That is why each valve comes to you with a two-year guarantee.

There is a "Leonard" valve suited to your work, and that you can depend upon.

Write for specification book.

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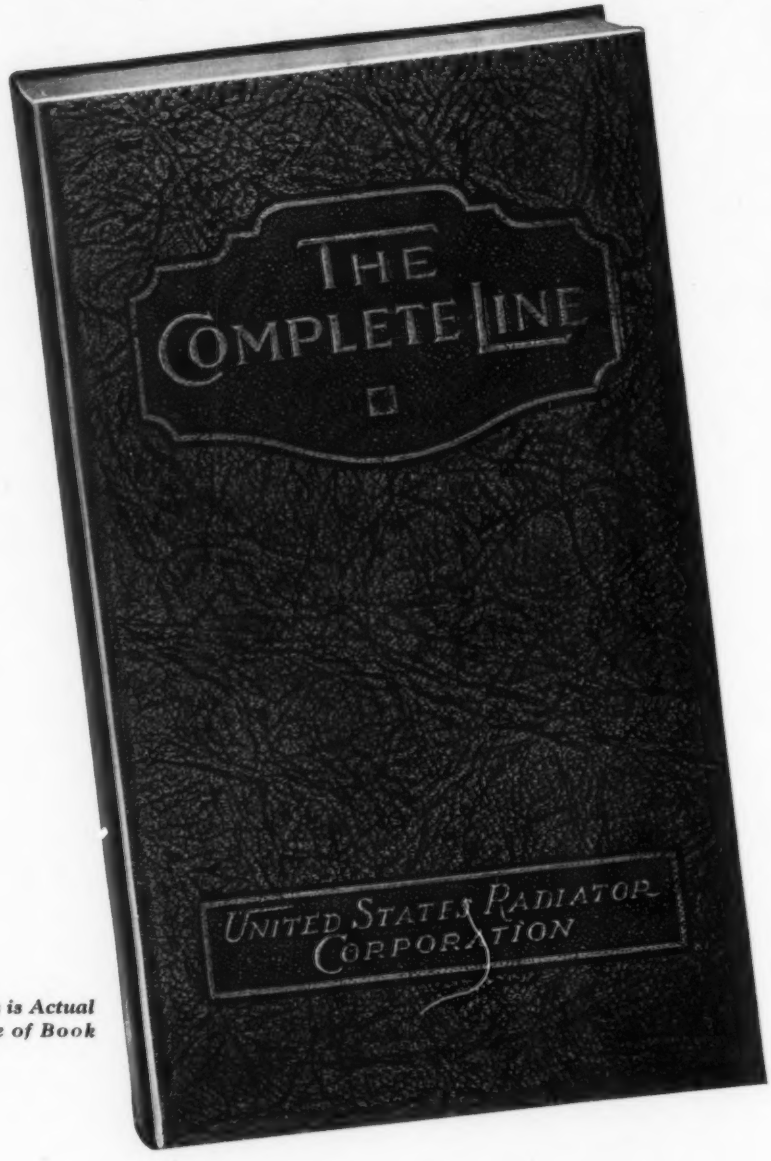
Our New Heating Catalog is Out



This is Actual Size of Book

Is There a Copy on Your Specification Desk?

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To Architects:

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For instance, if we say that Humphrey Automatic Gas Water Heaters are the best in the world—as we do honestly believe they are — the mere unsupported assertion leaves you cold. You are swayed by neither eloquence nor reiteration. You want to know *why.*

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We announce herewith a course of Humphrey lectures, brief, snappy and wholly to the point, to be published month by month in this and other architectural papers.

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We'll tell you what you want to know in your own language, and all we ask you is to pay the attention due to age and a deep knowledge of our subject.

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The Spencer system offers advantages that cannot be found in any other method of cleaning.

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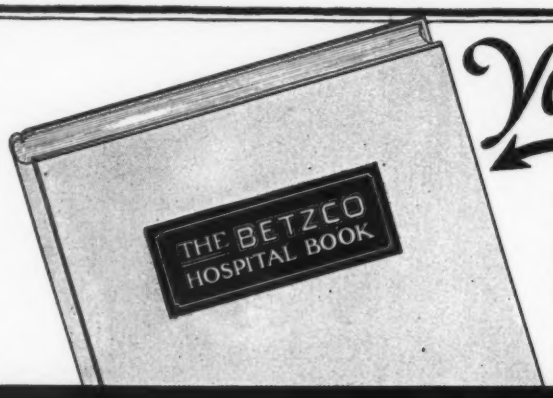
Manchester Memorial Hospital, Manchester, Conn.
Smith & Bassette, Architects



Yours for the asking

THIS book and contents will be tremendously interesting to the hospital architect. It represents a distinct departure from the usual Hospital Catalog. In fact, it is a book rather than a catalog and is filled to the brim with new and useful information about furniture and equipment for all divisions of hospital service, including specially designed sets for outside clinics and out-patient work. We are reserving copies only for architects who are interested in having it on their book shelves as a guide in the selection of substantial, modern hospital furniture and equipment, etc.

Features that will be of interest to hospital architects are the Mobile Chipped Ice Cart, Book Carriage, Venereal and Urological Outfits, the new Chilless Bed with the Victor rail lock, new hospital laboratory outfits, the Betzco Multi-Plane Hydraulic Operating Table, the St. Vincent's Food Carriage, steel storage shelving and many other new equipment specialties. To send for the book puts you under no obligation — this complete hospital equipment guide is *yours for the asking.*

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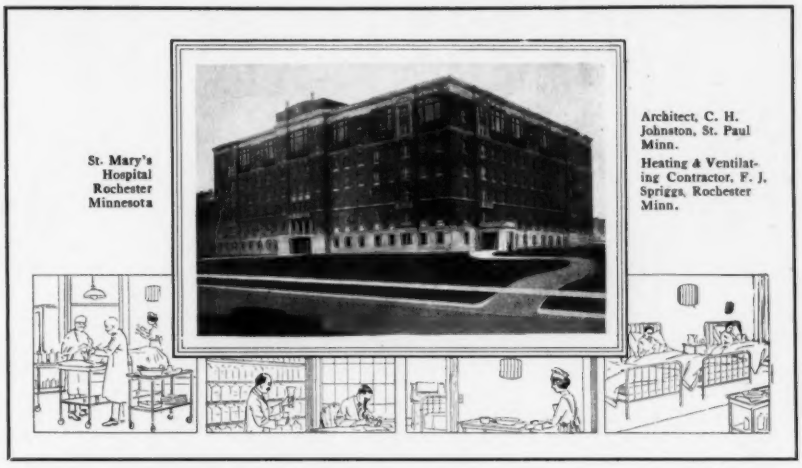

St. Mary's Hospital Rochester Minnesota

Architect, C. H. Johnston, St. Paul Minn.

Heating & Ventilating Contractor, F. J. Spriggs, Rochester Minn.

Selected for this World famous hospital

AT St. Mary's Hospital, Rochester, Minnesota, where the famous Mayo Clinics are held, fifteen Clarage Multiblade Fans are keeping this great institution supplied with clean, pure, fresh air from the out-of-doors.

The selection of Clarage Fans for this great hospital is significant. To build the best hospital that could be built it was necessary to use throughout the best equipment that could be had. Nothing was more important than ventilation — so probably nothing received greater attention than the choosing of fans.

And Clarage Multiblades were adopted!

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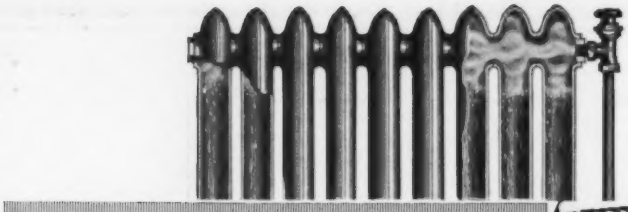

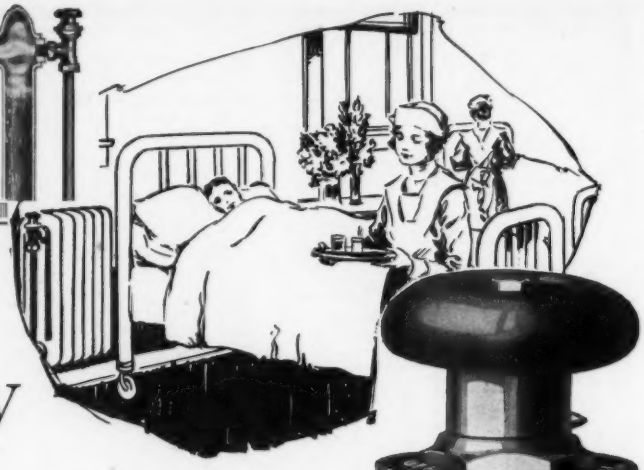

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H. B. Thomson, Architect
Dallas, Texas

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The Kelsey Warm Air Generator is entirely different from any other system. It is built with a series of hollow zig-zag tubes, which form the fire pot and combustion chamber, so designed that the products of combustion travel completely around all surfaces of the tubes before entering the chimney. It delivers fresh, warm humidified air in large volumes and at a high velocity to every room in the house, regardless of the direction of the wind, and its consumption of coal is phenomenally low. Its construction is heavy and durable, and with ordinary care it will last a lifetime.

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If you are at all interested in the subject of water service piping, we shall be glad to send you, when issued, a copy of our book, "Brass Pipe and Piping." It deals with corrosion, its theory and prevention; discusses the advantages and disadvantages of the various pipe metals, and gives instructions for handling brass pipe, laying out installations and figuring costs. Copies are gratis on request—use this coupon.

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Mt. Sinai Hospital, New York — A. W. Brunner, Architect

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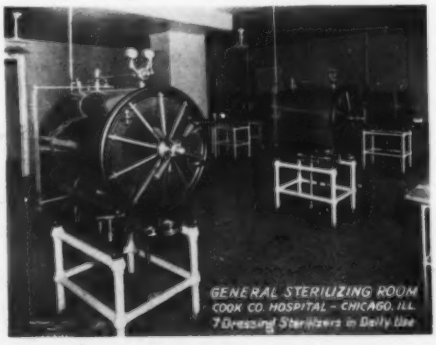
This in itself is evidence of the confidence placed in us by the hospitals, and the medical-and architectural professions.

These are but a few of the more modern hospitals of prominence that are equipped with Kny-Scheerer sterilizers and other products.

Fifth Avenue (N. Y.) Hospital — York & Sawyer Architects



Cook County (Ill.) Hospital
R. E. Schmidt, Garden & Martin, Architects

Victory Memorial Hospital Waukegan, Ill.
R. E. Schmidt, Garden & Martin, Architects

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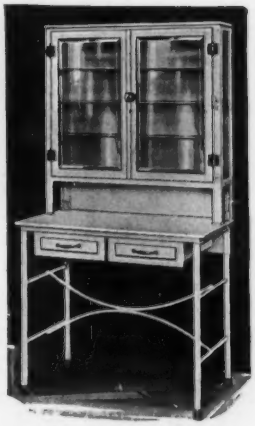

Hospital Furniture

Inset Wall Cabinets, Fire Hose Cabinets, Operating Room Furniture

Hospitals Furnished Complete

A Suggestion List, outlining the complete equipment of a Modern Hospital, will be sent upon request

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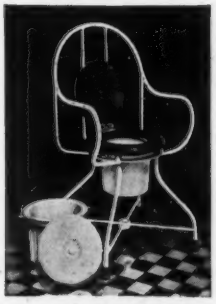
Surgical Instruments, Chemical Glassware, Rubber Goods, Gauze, Cotton, Serums, Thermometers, Bacterines, Vaccines, Neo-Salvarsan, Microscopes, Braces, Elastic Stockings



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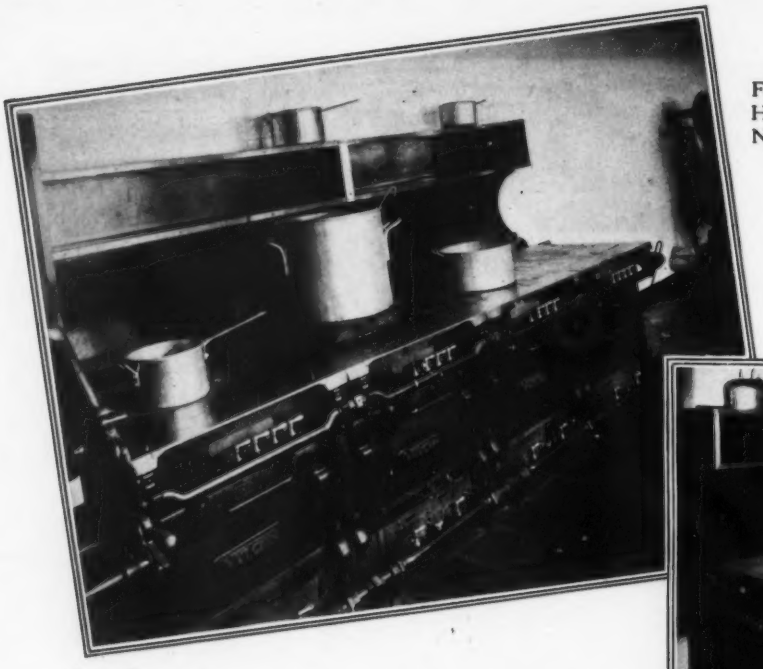

Fifth Avenue
Hospital
New York City

Mt. Sinai
Hospital
New York City

The Kitchens of These Two Great New York City Hospitals Are Equipped With

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The equipment we supply—gas ranges, broilers, ovens, etc.—is in itself an important contribution to cooking efficiency and economy. But the choosing of the proper units and their arrangement, which requires a special knowledge and talent, is of almost equal importance.

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Write for particulars of the service we offer and folders which fully describe the many superior features of Vulcan Gas Ranges and Kitchen Equipment.

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Hotel Marlboro-Blenheim, Atlantic City, N. J.
Hotel Martinique, New York City
McAlpin Hotel, New York City
Bunn Bros. Cafeterias, New York City
Knickerbocker Grill, New York City
Terminal Restaurant (Union Station), Washington, D. C.
New York Athletic Club, New York City
Union League Club, New York City
Westchester Biltmore Country Club, Rye, N. Y.
Princeton University, Princeton, N. J.
Purdue University, Lafayette, Ind.
Smith College, Northampton, Mass.
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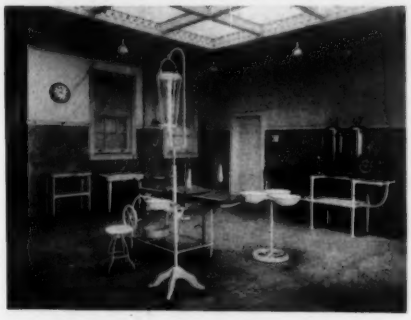

Does the Hospital Run on "Standard" Time Throughout?

Note:

45% of all the **schools** mentioned in the August Special School issue of *The Forum* are or will be equipped with Standard Electric Time and Program Systems!

67% of 112 cities of over ten thousand population, picked at random, in a recent investigation, report their schools using Standard Electric Time Systems!

It is a matter that often assumes vital importance.

All the personnel of a hospital should always have accurate, synchronized time available in any part of the buildings. Efficient, methodical, supervised work is helped greatly by "Standard" controlled time.

Programs, Call Systems, Checking and Recording Devices are other desirable features made possible by "Standard" Electric Time Systems.

In the efficient management of a hospital especially designed Standard Electric Time and Program equipment is essential.

For over thirty-five years we have supplied Time and Program apparatus to hospitals.

You should have in your files the complete data we shall be glad to supply, without obligation. Send for it. Our service department is at your disposal.

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End This Million Dollar Evil!

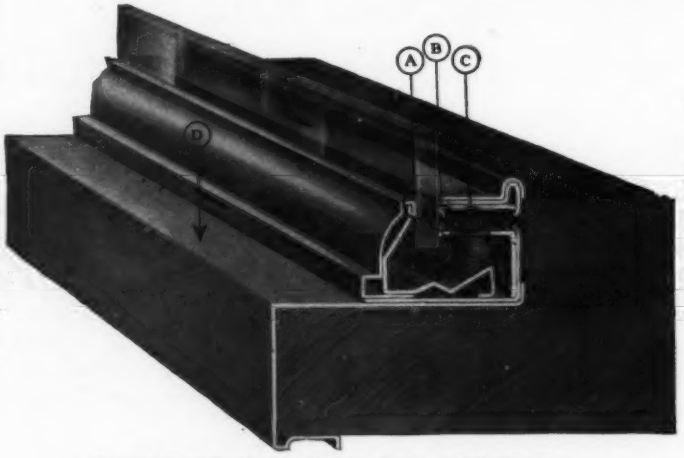
Insurance figures reveal that millions of dollars literally "go to smash" each year through plate glass breakage. And the loss of time and show window space would add many millions more.

Yet this huge national waste is needless and preventable. Faulty setting is the chief cause. Faulty setting is next to impossible when you include in all your store front specifications the following

Glazing Specification

All Metal Sash, Corner Bars, Division Bars and Self-Adjusting Setting Blocks Used in Store Fronts Must Be Listed by the Underwriters' Laboratories

A is the point where the outer member presses against the glass, when the delicate, watchlike turning of the key at C brings the glass automatically into contact with the rabbet of gutter B sliding on the anti-friction Murnane Self-Adjusting Setting Block.



The Sill Covering D extends from the inner side of the rabbet to the lower edge of the face, eliminating joints —perpendicular screws or nails — positively protecting the wood against deterioration, for leakage is impossible.

No. 110 Zouri Combination Key-Set Sash and 705 Sill Covering

Why tolerate an unnecessary evil when this certain remedy is known? The installation of Zouri Key-Set Construction will prove a boon to insurance companies, manufacturers, merchants and consumers.

All Zouri Key-Set Sash, Corner, Division Bars and Self-Adjusting Blocks have been listed by the Underwriters' Laboratories.

Zouri Drawn Metals Company

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THE NEW No. 40 SASH

AS USED IN

Kawneer SOLID COPPER **STORE FRONTS**

Architects will, we believe, appreciate the many features of this latest addition to Kawneer Store Front Construction. Extra heavy gauge metal gives rugged strength and enables it to be installed with any kind of a sill: marble, stone, tile or concrete. Machine adjustment screws afford accurate control of the grip on the plate glass. Of course Kawneer Resiliency is a basic feature. The trim architectural lines also make this sash very attractive.

As shown in the detail section below, control of ventilation and drainage may be provided for as in other Kawneer sash by a gutter member.

Our new complete Catalog "L" is now ready for distribution. It is designed to give architects the sort of information they should have about Kawneer Store Front construction. We shall be glad to mail samples of this new sash and a copy of our new Catalog "L" to architects.

THE **Kawneer** COMPANY
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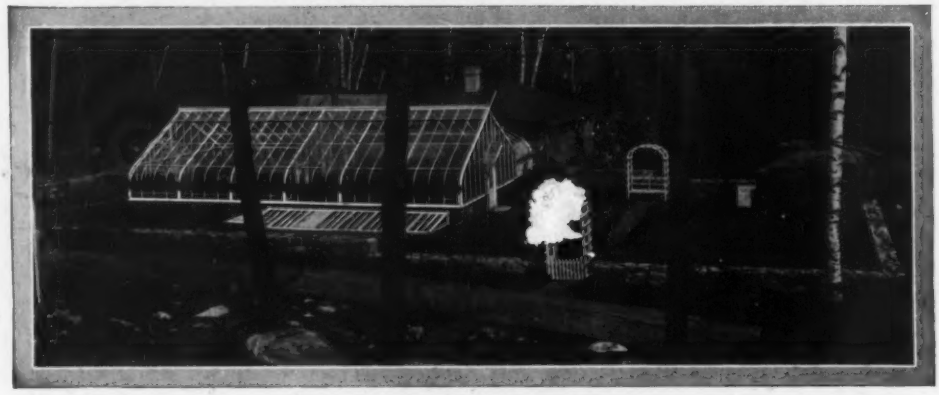
We have more than seventy branch offices and sales agencies in the principal cities of the country We shall gladly refer architects to the nearest sales agency for service and any information desired

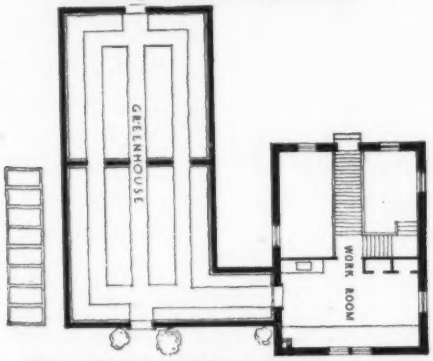
Estimates covering Kawneer store front material will be furnished gladly upon request. Just drop us a line giving details of your specification. Our estimates will be made up and sent to you promptly.



Erected for Dr. J. H. Lancashire

Layout, Manchester-by-the-Sea, Massachusetts

The connecting passage, aside from giving a fine little propagating house, places the work room far enough from the greenhouse so it casts no shade.



The greenhouse proper is 25 feet wide, 50 feet long and divided into two compartments.

Hitchings and Company

Greenhouse and Conservatory Builders

Home Office and Factory, Elizabeth, N. J.

New York 101 Park Avenue
Philadelphia Empire Building
Boston 9 294 Washington Street
Rochester Commerce Building

RICHARDS-WILCOX R-W AURORA TRADE MARK

The new Jersey City Hospital, Jersey City, N. J. John T. Rowland, Jr., Jersey City, N. J., Architect

AIR-WAY TRADE MARK

Multifold Window Hardware

Floods Hospitals with Sunshine and Fresh Air

RICHARDS-WILCOX R-W AURORA TRADE MARK

RICHARDS-WILCOX R&W AURORA TRADE MARK

How this and other great hospitals utilize

AIR-WAY TRADE MARK

Here is a near view of one of the group of buildings comprising the new Jersey City Hospital at Jersey City, N. J. Observe that the windows of the entire top floor, as well as those of the sunrooms on the first three floors, are fitted with AiR-Way Multifold Window Hardware. Among other AiR-Way equipped hospitals are the Jefferson County Tuberculosis Sanitarium, Jefferson, Wis., St. Margaret's Hospital, Spring Valley, Ill., and the Wm. Beaumont General Hospital, erected by the U. S. Government at Fort Bliss, Texas.

RICHARDS-WILCOX R&W AURORA TRADE MARK

RICHARDS-WILCOX R&W AURORA TRADE MARK

Completely closed

Adjusted for ventilation

These pictures show the advantages of

AIR-WAY TRADE MARK

Windows equipped with AiR-Way Multifold Window Hardware fit snugly and exclude all wind and rain. When adjusted for ventilation, they do not permit the wind to blow directly into the room and are absolutely rattle-proof. When completely opened, they afford an unobstructed opening almost the full width of the frame.

AiR-Way equipped windows swing inward without interfering with the screen, which may be applied in the usual manner. If desired, curtains and shades may be attached directly to each sash.

Completely opened

RICHARDS-WILCOX R&W AURORA TRADE MARK

RICHARDS-WILCOX R&W AURORA TRADE MARK

AIR-WAY TRADE MARK

Weather-tight Rattle-proof

In hospital construction it is highly necessary to guard against drafts and irritating window noises. Both these annoyances are prevented by the use of AiR-Way Multifold Window Hardware. The two upper illustrations at the right show why AiR-Way equipped windows are proof against wind and rain, while that below shows the parts which positively control each sash and eliminate slamming and banging.

Because of these superiorities, architects everywhere agree that AiR-Way equipped windows are far more desirable for hospital use than the ordinary type of sliding-folding window. They also are unexcelled for durability and ease of operation.

We want every architect to be thoroughly acquainted with AiR-Way Multifold Window Hardware, as well as our many other items of building hardware. If you do not have our illustrated catalog, write us for Catalog FF-28. Remember, too, that our free engineering service is always at your disposal.

Richards-Wilcox Mfg. Co.

A Hanger for any Door that Slides

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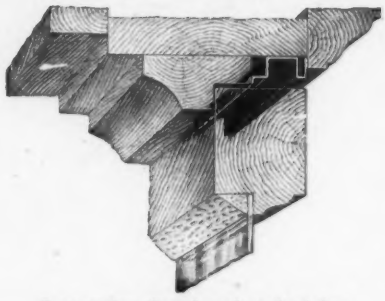
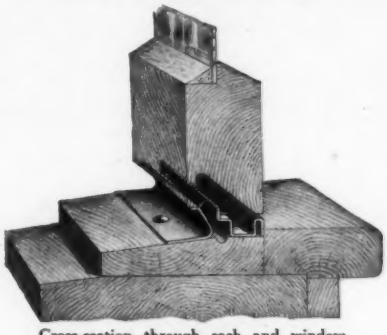
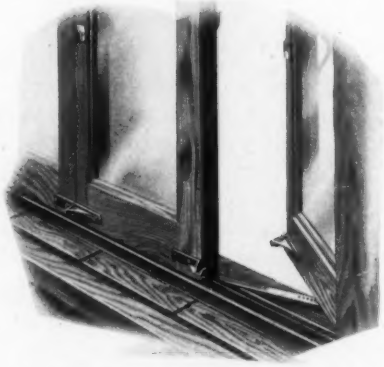
RICHARDS-WILCOX CANADIAN CO. LTD.
Winnipeg LONDON, ONT Montreal



Cross-section through sash and window frame at top, showing installation of AiR-Way track and the tight application of sash.



Cross-section through sash and window frame at bottom, showing installation of AiR-Way track and the tight application of sash. Note groove in bottom of sash which prevents moisture from seeping through.



A link connects each sash, at top and bottom, with the sash adjacent. When the windows are open, or partially open, the links prevent them from slamming and banging. When closed, the safety locks hold them tight and prevent rattling.

RICHARDS-WILCOX R&W AURORA TRADE MARK

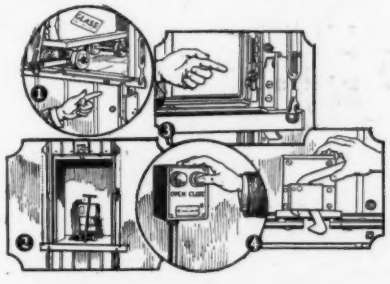
The Atlantic Macaroni Co., Building
King & Campbell, Architects
White Construction Co., Builders

What architects should know about Peelle Doors!

PEELLE DOORS are the highest type of freight elevator doors made. Their counterbalanced construction insures long service and greater efficiency. The vertical operation permits full clearance for loading and unloading. The exclusive truckable feature insures safety of trucking into and out of elevator. They bear the label of the Underwriters Laboratories.

Besides being installed in the Atlantic Macaroni Building, PEELLE FREIGHT ELEVATOR DOORS are installed in hundreds of other buildings throughout the country. Architects of experience and repute specify PEELLE when freight elevator enclosures are required.

The PEELLE Catalog tells in detail all that architects should know about PEELLE DOORS. Send for it, without obligation.



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2. *Vertical operation allows full clearance.*
3. *Durable, Counterbalanced Construction.*
4. *Operated by hand or electricity.*

PEELLE Freight Elevator DOORS

Counterbalanced-Truckable

THE PEELLE COMPANY · · · Brooklyn, N. Y.
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Partial List of RODDIS FLUSH DOORS

Furnished for Hospitals during the past few months

November 15, 1922

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State Hospital	Ashland, Pa.	Henry C. Pelton
Hospital Atlanta	Atlanta, Ga.	Wyatt & Nolting
Wesley Memorial Hospital	Atlanta, Ga.	Hentz, Reid & Adler
Augusta State Hospital	Augusta, Ga.	E. T. Stevens & C. G. Bunker
U. S. Public Health Service	Augusta, Ga.	J. M. Geary
Sturdy Hospital	Attleboro, Mass.	Kendall Taylor Co.
Church Home & Infirmary	Baltimore, Md.	Wyatt & Nolting
Union Memorial Hospital	Baltimore, Md.	J. Evans Sperry
Hospital for Communicable Diseases	Baltimore, Md.	E. H. Glidden
Tuberculosis Sanatorium	Barre, Vt.	Penber & Campaigne
U. S. P. H. S. Hospital	Baynard, New Mexico	Supervising Architect, Wash., D. C.
Hospital at Bluefield	Bluefield, W. Va.	A. B. Mahood
Northwestern Hospital	Brainerd, Minn.	J. O. Sederberg, Jr.
Isolation Hospital	Bridgeport, Conn.	Cross & Cross
Buffalo City Hospital	Buffalo, N. Y.	E. J. & W. A. Kidd
St. Peter's Hospital	Charlotte, N. C.	L. H. Ashbury
Government Hospital	Chehaw, Ala.	J. A. Wetmore
St. Mary's Hospital	Cincinnati, O.	J. F. Sheblessy
St. Francis Hospital	Cincinnati, O.	J. F. Sheblessy
Mercy Hospital	Columbus, O.	E. K. Hibbs Eng'ing & Cons. Co.
Soldiers & Sailors Hospital	Dayton, O.	Schneck & Williams
Edgerton Hospital	Edgerton, Wis.	Berlin, Swern & Randall
Male Ward Bldg. No. 10	Foxboro, Mass.	McLaughlin & Burr
Male Ward Bldg. No. 11	Foxboro, Mass.	McLaughlin & Burr
N. H. State Sanatorium	Glencliff, N. H.	C. R. Whitcher
Tuberculosis Sanatorium	Grand Rapids, Mich.	Robinson & Campan
T. B. Sanatorium, Ad. Bldg.	Grand Rapids, Mich.	Robinson & Campan
Holden Hospital	Holden, Mass.	Fuller & Delano Co.
Madigan Hospital	Houlton, Me.	J. C. & J. H. Stevens
Dobbs Ferry Hospital	Irvington, N. Y.	Chas. Butler & R. D. Kohn
St. Joseph Hospital	Lancaster, Pa.	C. Emlen Urban
Marion Hospital	Marion, Ind.	Frank L. Packard
St. Joseph Nurses' Lodge	Marshfield, Wis.	L. Brielmaier & Sons
Shriners Hospital for Crippled Children	Minneapolis, Minn.	Bertrand & Chamberlain
Eye, Ear, Nose & Throat	New Orleans, La.	Favrot & Livandais
Government Hospital	Norfolk, Va.	Sidley Chaplain
Norwalk Hospital	Norwalk, Conn.	Wm. A. Boring
Clark Co. Hospital	Owen, Wis.	Claude & Starck
Masonic Home	Philadelphia, Pa.	Ballinger Co.
Multnomah Hospital	Portland, Ore.	Sulton & Whitney
Utah Co. Insane Asylum	Provo, Utah	Joseph Nelson
St. Mary's Hospital	Rochester, Minn.	C. H. Johnson
Rutland Hospital	Rutland, Vt.	Treas. Dept. U. S. A. Arch.
Northern State Hospital for Insane	Sedro-Wooly, Wash.	Heath, Gove & Bell
Saginaw General Hospital	Saginaw, Mich.	Schmidt, Garden & Martin
Hebrew Home for Aged & Disabled	San Francisco, Calif.	Samuel Lightner
St. Joseph Hospital	St. Paul, Minn.	John H. Wheeler
Insane Asylum	St. Joseph, Mo.	Siemens & Arnhold
Jefferson Barracks Hospital	St. Louis, Mo.	Sup. Arch., Wash., D. C.
Sheboygan Clinic Bldg.	Sheboygan, Wis.	Edgar Stubenrauch
St. Joseph Hospital	Lewiston, Ida.	Beezer Bros.
St. Luke's Hospital	Kansas City, Mo.	Keene & Simpson
St. Anthony's Hospital	Terre Haute, Ind.	J. G. Vrydagh
Uniontown Hospital	Uniontown, Pa.	Harry W. Altman
Vineland Hospital	Vineland, N. J.	Stearns & Woodmutt
Inf. Bldg. Minn. State San.	Walker, Minn.	C. H. Johnston
Wallum Lake Hospital	Wallum Lake, R. I.	W. F. Fonatine
Municipal Hospital	Waterbury, Conn.	Cross & Cross
Wausau Hospital	Wausau, Wis.	L. Brielmaier & Sons
Hale Hospital	Wilmington, O.	Vernon Redding
Worcester Hospital	Worcester, Mass.	Fuller & Delano
Waynesboro Hospital	Waynesboro, Pa.	Wyatt & Nolting

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It is, by actual test, twenty-five times as fire retarding as the panel door. It is soundproof and waterproof. It is sanitary and lasts a lifetime, becoming more beautiful with age.

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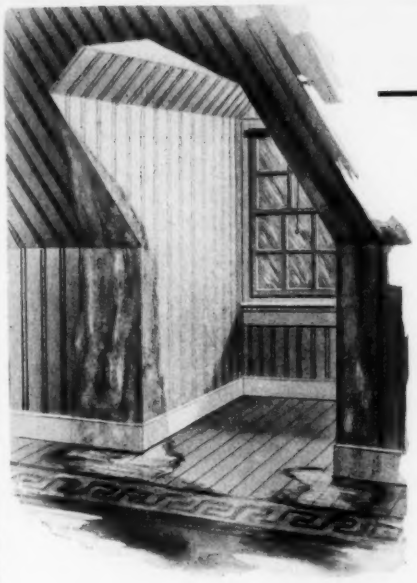

—these leaks are preventable

Every rain storm causes thousands of dollars of damage to walls, floors and furniture in buildings where unsuitable material has been used for valleys, gutters or flashings.

But trouble of this character can be permanently prevented by using the right kind of material for these important places.

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the old reliable hand-made, hand-dipped tin, made by an old Welsh process in which each sheet is ***repeatedly soaked and dipped in pots of boiling palm oil and molten metal consuming 35 minutes' time to coat each sheet,*** and insuring an amalgamation of the coating with the base plate that cannot be done in any other way.

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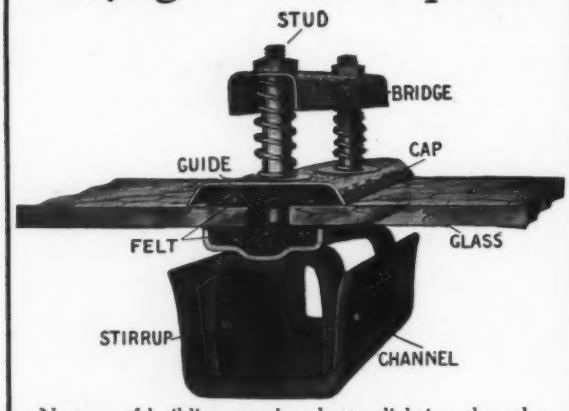
District Sales Offices: Boston, Chicago, New York, Philadelphia, Pittsburgh, Portland, Ore., San Francisco

Underwood & Underwood
Part of Mt. Sinai Hospital, New York

Skylights for Hospitals



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See our advertisement on page 928 of Sweet's

Walker & Gillette
Architects

Grasslands Hospital
East View, New York

Modern Hospitals use Hastings Shayd-Awns to Close Openings on Porches

OLD-FASHIONED awnings and similar protective measures against sun, wind and weather are half-measures. They do not give adequate protection when in use, and they present difficult storage problems when out of use.

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Architects interested in hospitals will be interested in the Hastings Shayd-Awn. Write to us for further information

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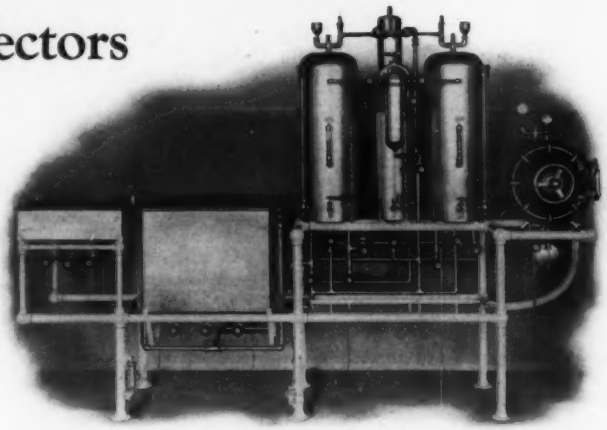

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Our engineering department co-operates with architects. Our service provides data complete in every detail. Your inquiry will have a satisfactory reply.

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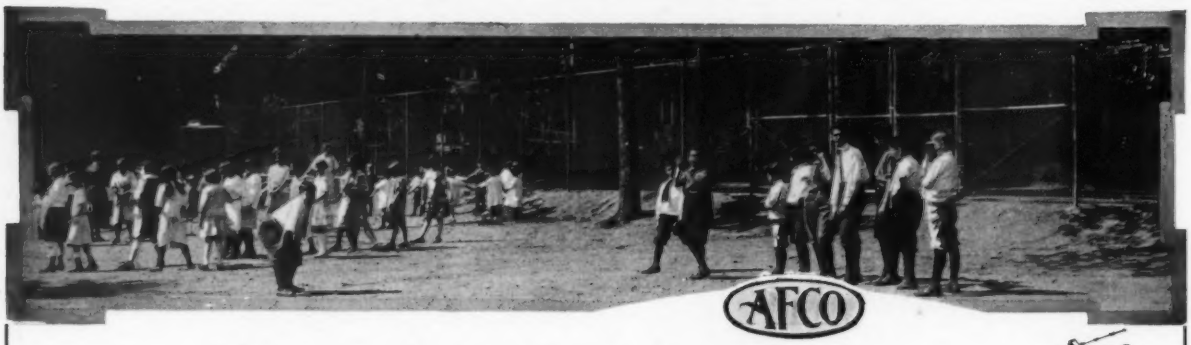

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Fence that will be so completely satisfactory that, like others for whom we have done school and playground work, you will be dropping in to say how fine the newly Afco-enclosed grounds are and that it is Afco Fence first, last and all the time for you.

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Afco School Yard, Playground and Athletic Field Fences, like Afco Industrial Fence, are sturdy steel fences of notably common sense build.

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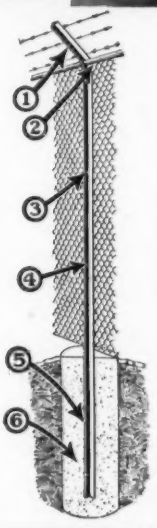
Admission only through the gate

Afco Fence for the Athletic Field and Playground is built with the non-breakable Afco integral overhanging arm carrying barbed wire, as shown to the right. It is non-climbable. No one comes in over the fence; everybody enters through the admission gate.

Each circle a special Afco Fence feature.



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American Fence Construction Co., 130 West 34th St., New York

St. Vincent Hospital, Billings, Montana. The roof of this building is finished with a Ruberoid Built-up.

Ruberoid Built-up Roof showing tile finish

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Ruberoid Built-up Roofs are constructed of asphalt throughout, and may be used with or without special finishes. With a tile finish they can be recommended especially for school or hospital purposes where the roofs are often in constant use, for continuous foot traffic will not injure them.

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BUILT-UP ROOFS

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21 Round Trips for one cent

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For Scale Drawings and Specifications see Sweet's pages 2007-2015, or G&G October, 1921 Catalog

GILLIS & GEOGHEGAN
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REG. U.S. PAT. OFF.

"Giant Metal," "Red Metal" and Steel

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Utica Masonic Memorial Hospital, Utica, N. Y.
H. P. Knowles, Architect, New York

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See illustrations and description of this hospital in preceding pages of this issue.

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ORIGINATORS OF SASH CHAINS

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They control the light and air, and contribute largely to the patients' rest and comfort.

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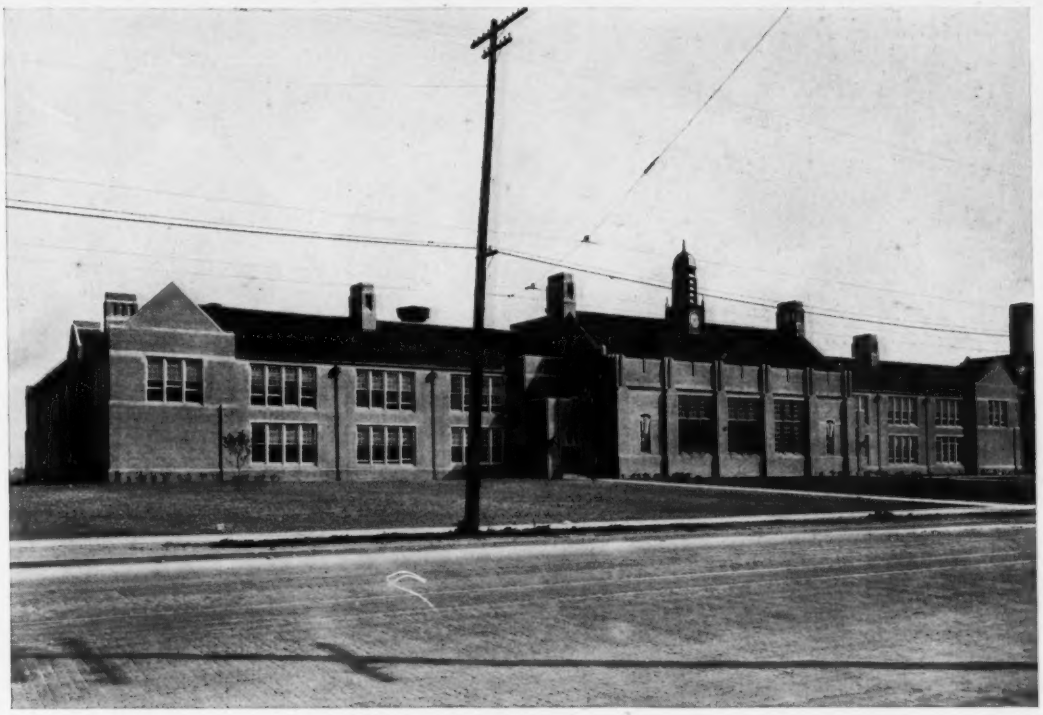

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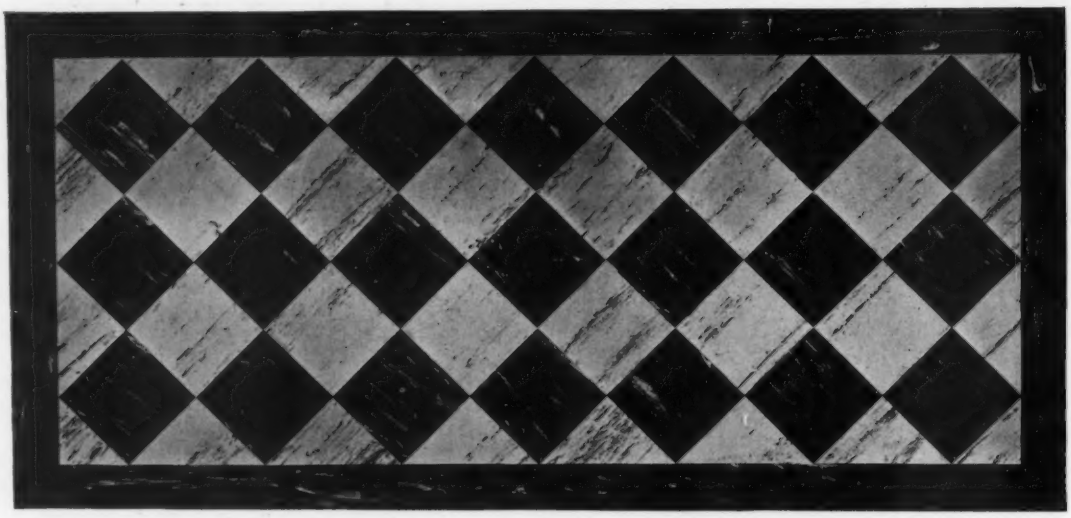

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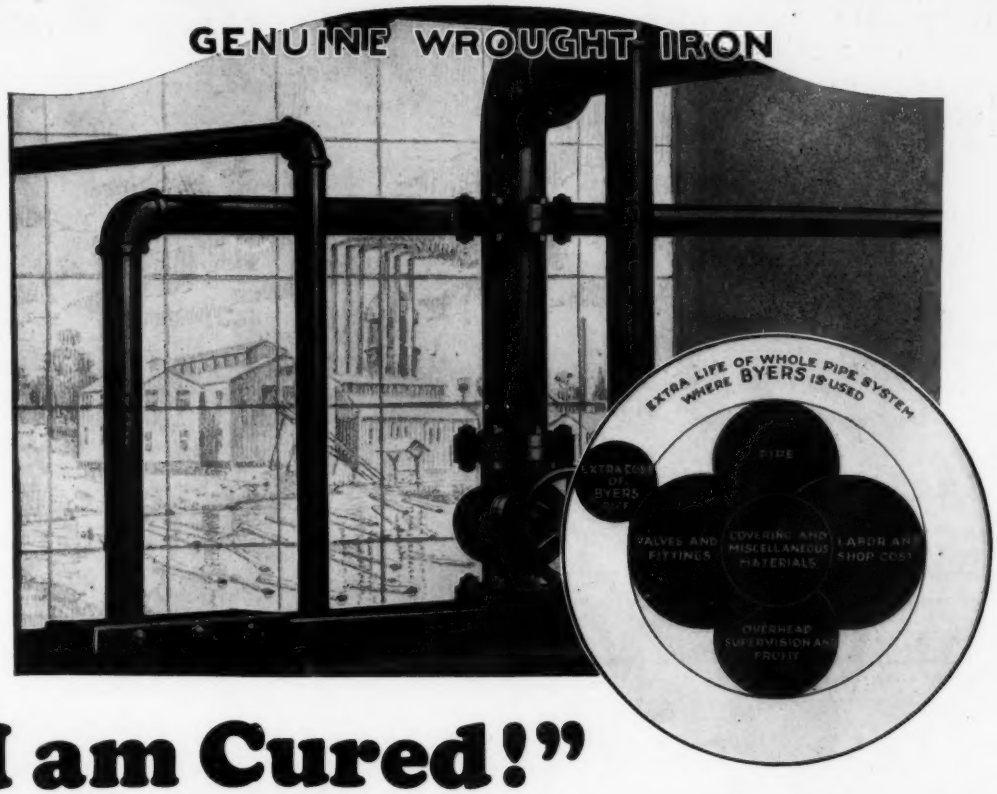
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"CREO-DIPT" Stained Shingles have won the approval of prominent architects and builders because of their quality as well as their fast colors. The open market does not afford such quality in either shingles or stain.

Pure earth pigments ground in pure linseed oil are driven into the fibres of the wood with creosote. They save muss of staining-on-the-job, painting and repair bills. You secure color effects not possible with other materials.

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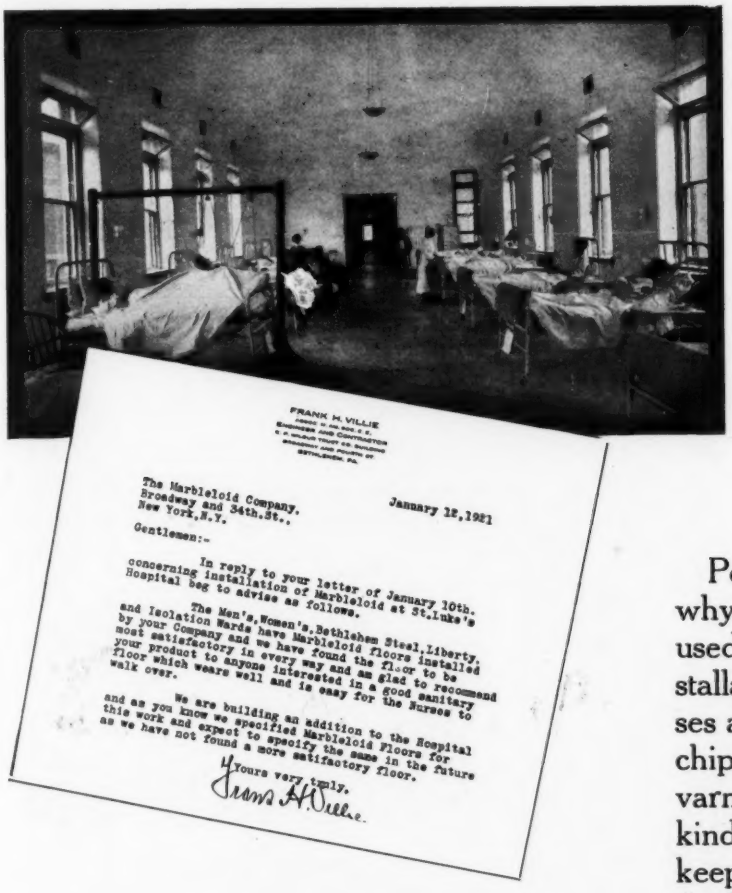


FRANK H. VILLIE

The Marbleloid Company, January 12,1921
Broadway and 34th.St.,
New York,N.Y.

Gentlemen:-

In reply to your letter of January 10th. concerning installation of Marbleloid at St.Luke's Hospital beg to advise as follows.

The Men's,Women's,Bethlehem Steel,Liberty, and Isolation Wards have Marbleloid floors installed by your Company and we have found the floor to be most satisfactory in every way and am glad to recommend your product to anyone interested in a good sanitary floor which wears well and is easy for the Nurses to walk over.

We are building an addition to the Hospital and as you know we specified Marbleloid Floors for this work and expect to specify the same in the future as we have not found a more satisfactory floor.

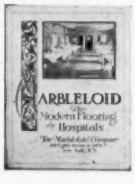
Yours very truly,

Frank H. Villie

Marbleloid Flooring is used throughout the Nurses' Home of St. Agnes Hospital, Philadelphia, which is illustrated and described on page 307 in this issue of "Architectural Forum."

QUALITIES of Marbleloid Flooring which appeal to hospital architects are: **Sanitary**– it could not be more so for there is not a crevice or corner in the entire floor where germs or dust could hide. **Fireproof, Warm, Quiet. Offers an easy and certain foothold. Always attractive. Quickly cleaned.** Manufactured, installed and guaranteed by one organization.

Perhaps the most logical reason why Marbleloid Flooring should be used in hospitals is that after its installation flooring worries and expenses are ended. This flooring will not chip or dust, require painting or varnishing, resurfacing or any other kind of alteration or expensive upkeep. The floor is as permanent as the building, and the color is as permanent as the floor. It is easy to see that the first cost is the last cost, therefore it is bound to be an economical flooring.



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SOIL
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ST. VINCENT'S HOSPITAL, Toledo, Ohio: Thomas F. Huber, Architect; American Plumbers Supply Co., Jobber; R. Rautz & Co., Plumber

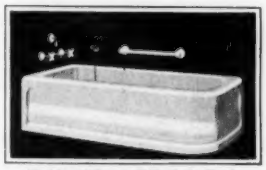
KOHLER

And ST. VINCENT'S HOSPITAL, Toledo

There are thirty new pieces of Kohler Enameled Plumbing Ware in *St. Vincent's Hospital*, Toledo. Eighteen are Kohler "Viceroy" Built-in Baths, a correct selection for a hospital installation, because the "Viceroy" design leaves no spaces where dirt can collect.

The famous Kohler enamel ably supplements the sanitary fitness of Kohler designs. This enamel, glassy-hard and uniformly white, gives a ready and glistening response to incessant cleanings.

Kohler design and Kohler enamel supply a double reason for the frequency with which Kohler Ware is specified for important installations of every kind. The name "KOHLER" inconspicuously but permanently fused into the enamel of every Kohler fixture is a mark of quality which your clients will appreciate having pointed out to them.



Kohler "Viceroy" Built-in Bath
Corner Pattern

* * *

The new Kohler Catalog F, just published, is a valuable handbook of the latest developments in fine plumbing ware. If you have not already received your copy, please write us on your business stationery.

KOHLER OF KOHLER

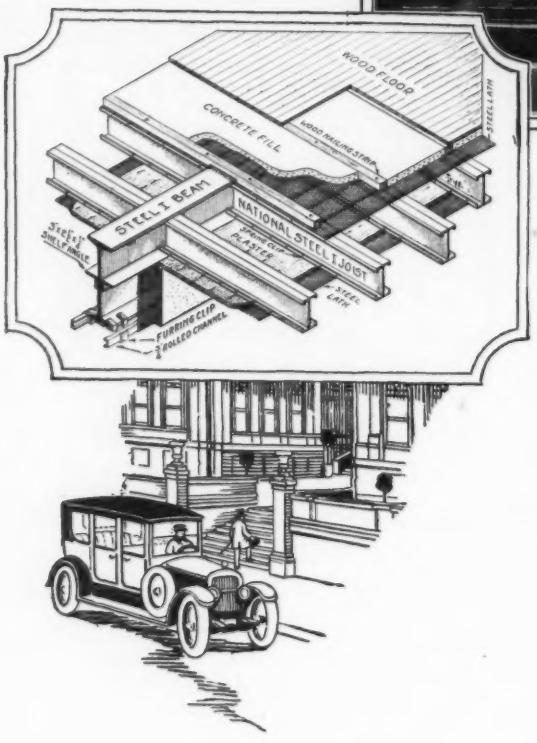
Kohler Co., *Founded 1873*, Kohler, Wis. *Shipping Point*, Sheboygan, Wis.

BRANCHES IN PRINCIPAL CITIES

MANUFACTURERS OF ENAMELED PLUMBING WARE AND KOHLER AUTOMATIC POWER AND LIGHT 110 VOLT D. C.

Methodist Episcopal Hospital, St. Joseph Missouri

Eckel & Aldrich Architects



National Steel Joists In Hospital Construction

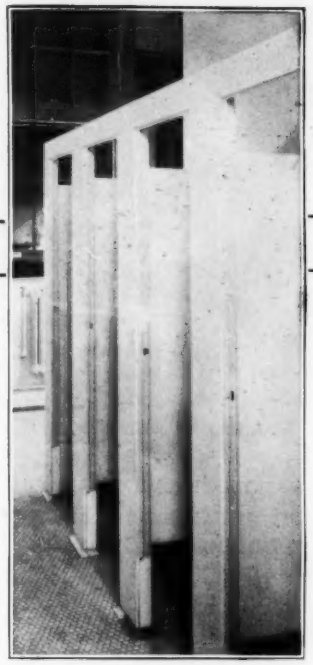
THAT usually large item of cost in the construction of any hospital—firesafe floors—can be very materially reduced when National Steel Joists are used.

Compared with other types of recognized firesafe floor construction, National Steel Joist floors eliminate over 50% of the dead weight. This means half the amount of material to buy, ship, handle and erect.

We have a cloth-bound handbook giving many tables, detail drawings and engineering data of value to any architect. We will gladly mail a copy upon request.

THE CENTRAL STEEL COMPANY
Massillon, Ohio

NATIONAL STEEL JOISTS



Non-porous — Non-absorbent
Stain-proof

VITROLITE

"Better Than Marble"

for

Wainscoting
Wall Surfacing
Toilet Partitions

in

Homes and Public Buildings of all descriptions

These three characteristics of Vitrolite are in themselves the strongest possible recommendations for its use in hospitals.

Here is a slab material that is by its very nature the utmost in sanitation. Its fire polished surface is harder than flint and will not scratch or score. Always looks clean and new. Acids and alkalies do not affect it. A damp cloth instantly removes spots or smears. Reduces cleaning costs. Also ideal for operating rooms, laboratories, bathrooms, table and counter tops, diet kitchens, shelving, etc. Furnished white, black or decorated.

A list of prominent hospital installations on request. For complete particulars or information, write

THE VITROLITE COMPANY

Chamber of Commerce Building, Chicago

Service Organizations in Principal Cities of America and Overseas

CAULDWELL-WINGATE CO., *Builders* MT. SINAI HOSPITAL ARNOLD W. BRUNNER, *Architect*

OTHER PROMINENT HOSPITALS IN WHICH NEW JERSEY TERRA COTTA HAS BEEN USED

PECK MEMORIAL, BROOKLYN, N. Y. : TUBERCULOSIS HOSPITAL, FALL RIVER, MASS.
CUMBERLAND STREET HOSPITAL, BROOKLYN : MONTEFIORE HOME, NEW YORK

THE NEW JERSEY TERRA COTTA COMPANY

OFFICE, SINGER BUILDING, NEW YORK CITY ESTABLISHED 1888 WORKS, PERTH AMBOY, NEW JERSEY

Home of
Frank H. Woods
Lincoln, Neb.
Paul Hyland
Architect
Chicago, Ill.

A Quarter Century of Good Will with Architects

BACK of every Kewanee Water Supply, Electric Light or Sewage Disposal System that you specify is a quarter of a century of successful experience in building private utilities plants for isolated homes, estates, clubhouses, institutions and public buildings. And you can specify the right Kewanee plant from our more than 150 styles and sizes with ease and assurance. Our 46 page bulletin, entitled "Specifications," will help you do it. Write for it today and have it in your files. We also offer you without charge the facilities and experience of our engineering and drafting departments.

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PRIVATE UTILITIES COMPANY

442 S. Franklin Street Kewanee, Illinois

This Booklet

should be in your library

IT tells all about the W&T process of chlorination now used in over two hundred swimming pools.

Send for a FREE COPY

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COMPANY, INCORPORATED
NEWARK, NEW JERSEY
SAN FRANCISCO KANSAS CITY CHICAGO
PITTSBURG KNOXVILLE DALLAS
MINNEAPOLIS TORONTO, CAN.

An Elevator Garage
Cannot Compete for Patronage With a Ramp Garage

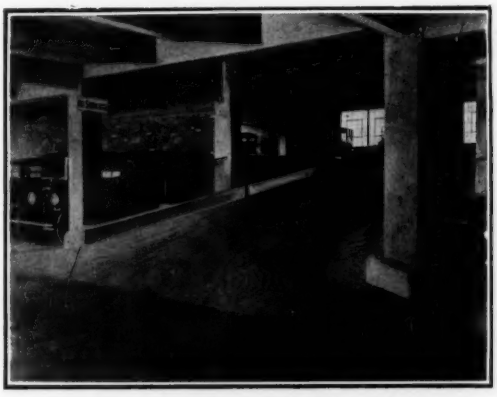
Whenever a ramp garage has been built near an elevator garage, the former has always obtained the lion's share of the business and the latter has been forced to take what was left, because motorists prefer a means of interfloor travel that is always available with never a moment's delay.

No man wants to invest in an unprofitable garage; yet one with elevators can only succeed as long as it has no ramp competition.

d'Humy Motoramps

Abolish the Elevator's Advantage in Space Economy

The ordinary ramp takes up so much good storage space that, even today, some plans occasionally provide one or more elevators in spite of their service disadvantages, higher cost, high maintenance charges, and possibility of breakdown. d'Humy Motoramps should be used; they offer all the service advantages of ramps and yet can be placed in less, or no greater, space than that required for elevators. The building invariably costs less per car; it commands patronage and yields a greater profit.



Note the complete visibility of this d'Humy Motoramp

d'Humy Motoramps provide a ramp installation that is as far ahead of the ordinary ramp as the latter is ahead of the elevator. It excels in safety and convenience; the half length inclines have open sides and afford full visibility. The d'Humy Motoramp is never an inclined tunnel.

Ask us to prepare a miniature sketch plan, for any plot you have in mind, to prove to you that our layout will give storage efficiency at least equal to an elevator plan — and at the same time give you ramp economy.

RAMP BUILDINGS CORPORATION
115 Broad Street, New York
Representatives in all Principal Cities

To extend its service more completely the Company desires a few additional structural engineers to act as representatives in certain territories still open.

d'Humy Motoramps — a Patented System of Building Design involving a combination of ramps with staggered floors

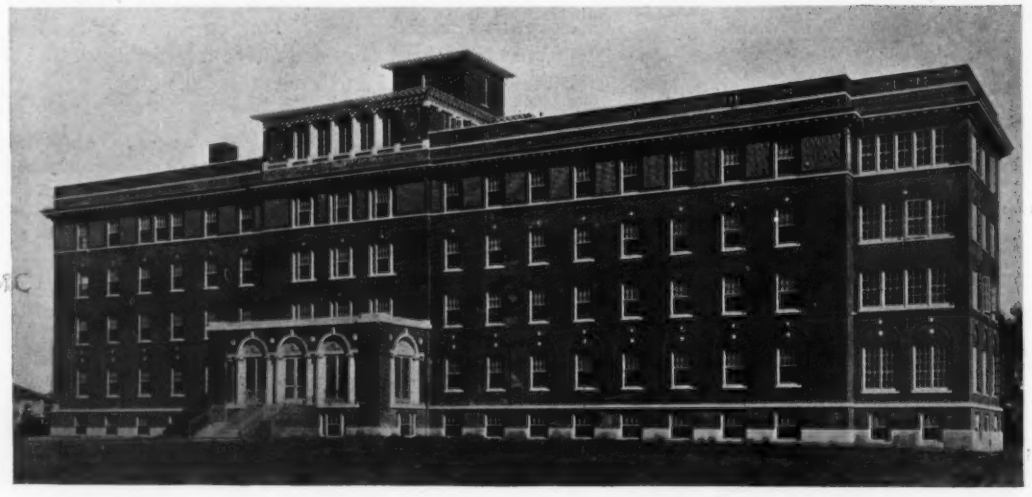
FIFTH AVENUE HOSPITAL, New York, N. Y. York & Sawyer, Architects

THESE beautiful Terra Cotta pilasters trim the front loggias of the new Fifth Avenue Hospital, completed only a few months ago. Rich, decorative details of this kind may be incorporated in hospital designing, at comparatively little expense, if Terra Cotta is the medium of their expression.

* *

TRIMMING the brick walls of this hospital are string courses, sill trim and cornice detail of Terra Cotta, with attractively designed columns and lunettes in the central feature.

WESLEY HOSPITAL, Wichita, Kan. Richards, McCarty & Bulford, Architects



NATIONAL TERRA COTTA SOCIETY

Nineteen West Forty-fourth Street *New York, N. Y.*

MASONIC SOLDIERS AND SAILORS MEMORIAL HOSPITAL
Utica, N. Y.
H. P. Knowles, Architect

Here the base course, sill trim, window lunettes, string courses, balustrade, and particularly the interesting entrance way in the Classic manner, are all Terra Cotta.

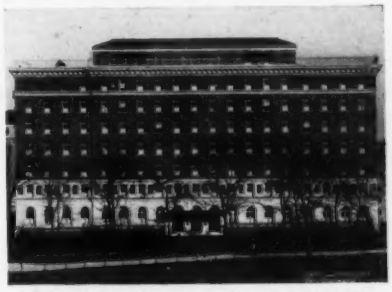
Architecture and Hospitals

ARCHITECTURE was of little moment in the hospitals of a few decades ago. Somber, gloomy structures, they gave to passers-by almost as great a feeling of depression as they gave to the bedridden within their walls.

Today there prevails a happier concept of what the aspect of a hospital should be. Exterior walls of the newest hospitals — like those pictured here — are faced with materials of cheerful colorings and trimmed with lightening decorative details of Terra Cotta. For Terra Cotta enhances a building not only by the interest of its color expression, but by the variety of its form as well.

Terra Cotta repeats ornament economically, units being pressed from original molds. There is no involved and costly hand-carving, no excessive expense. And the maintenance of Terra Cotta is likewise economical, owing to its unequaled water-proof, weather-proof and fire-resistant qualities.

When intelligently designed and intelligently incorporated in good construction, Terra Cotta maintains permanently its exceptional merit as a durable material.



MT. SINAI HOSPITAL, PRIVATE PAVILION
New York, N. Y.
Arnold Brunner, Architect

Under the top story of this newest pavilion of Mt. Sinai Hospital is a fluted string course of Terra Cotta, while cornice and pergola trim are likewise of this versatile material.

TERRA COTTA

Permanent *Beautiful* *Profitable*

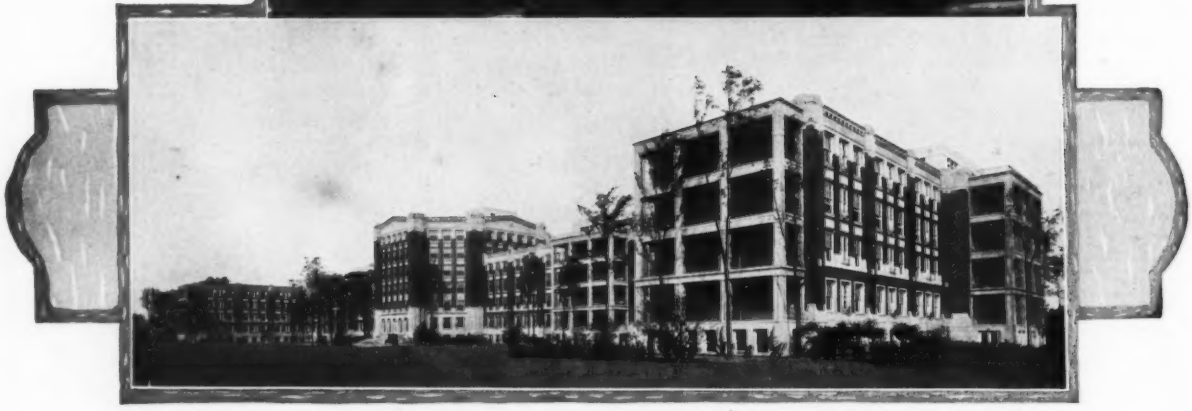
INDIANA LIMESTONE

Booklets sent free on request

Bloomington Hospital,
Bloomington, Ind.
Alfred Grindle,
Architect

Fifth Avenue Hospital,
New York City
York & Sawyer
Architects

Lower stories of
Indiana Limestone



Henry Ford Hospital, Detroit, Mich. *Albert Wood, Architect*

INDIANA
THE NATION'S

For Any Type of Hospital Building Use Indiana Limestone

Hospital buildings are prominent among important structures in any municipality. Such buildings are worthy of the best architectural expression.

And the small community is equally as proud of its well-designed hospitals as the larger city, where this character of building is often monumental.

Indiana Limestone has been proved practicable for any size hospital building. Illustrations on opposite page show its use for a hospital building at Bloomington, Indiana, the new Fifth Avenue Hospital, New York City, and for the artistic trim of the Henry Ford Hospital, Detroit. This natural stone assures a permanent, fireproof structure at a surprisingly low cost.

Our Architects' Service Bureau is prepared to assist you on projects of this nature.

Indiana Limestone Quarrymen's Association
Box 766, Bedford, Indiana
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LIMESTONE
BUILDING STONE

FISH BRICK
—*A Quality Product*

Wellington Memorial Home for Nurses
131st Street, West of Convent Avenue
Built in connection with, and owned by, the
Knickerbocker Hospital

Fish Brick

A complete assortment of textures, colors and color combinations is available in Fish Brick.

The quality of Fish Brick cannot be surpassed.

The price of Fish Brick, considering its high quality, is surprisingly low because quantity production permits of a minimum profit.

Fish Brick is represented throughout the United States and Canada

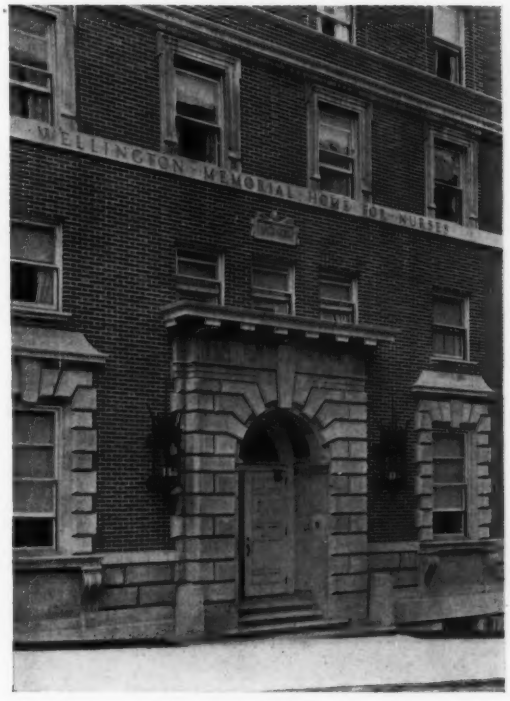
Samples and quotations supplied without obligation

FISH SERVICE
—*Always Dependable*

Sales Service

ALONG with Fish Brick goes Fish Brick Service — this means a sufficient quantity of your first choice delivered "on the job" on time—no need to fall back on an alternate choice.

Hospitals require immense quantities of face brick, since all facades are usually exposed. The choice of Fish Face Brick means the right brick and no delays.



Detail of Entrance, Nurses' Home
Architect: John Oakman
Contractor: James C. McGuire

Fish Brick Sales Company, Inc.

25 West 45th Street, New York

An Announcement

The Modern Hospital Publishing Co., Inc., announces a competition for plans of a

Small Community Hospital

in order to stimulate a greater interest in the construction of economically arranged and architecturally artistic hospitals, and in order to provide boards of trustees of small institutions with a group of suggestive plans that will make for more efficient care and treatment of the sick.

$1,000 in Prizes

will be given to architects through the competition, the general program of which was announced at the twenty-fourth annual conference of the American Hospital Association at Atlantic City, September 25-28.

A copy of the general program of the competition will be gladly furnished any interested architect.

Final date for registration, December 15, 1922.
Final date for submitting designs, February 1, 1923.

The
Modern Hospital Publishing Company, Inc.
22 E. Ontario Street
Chicago, Ill.

BRASS PIPE

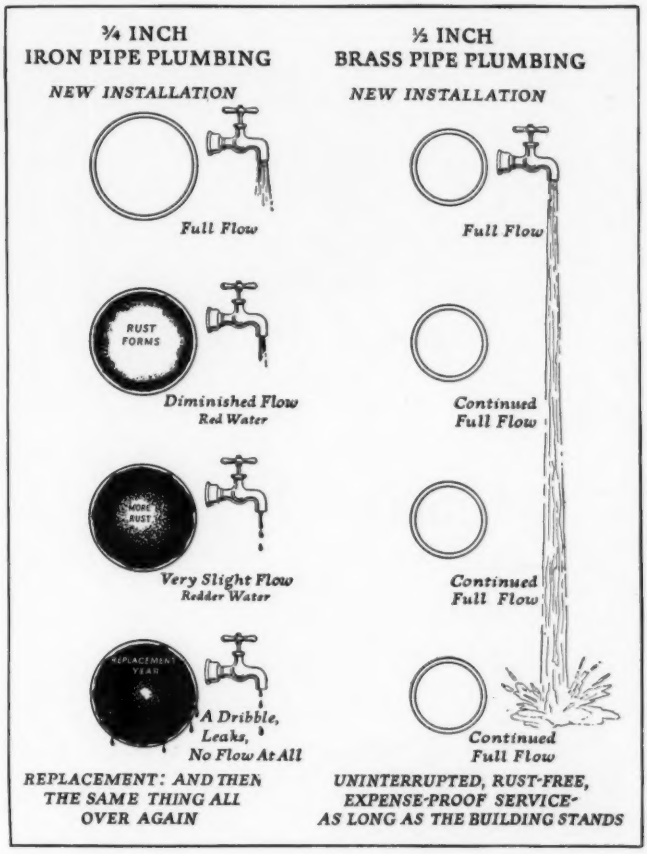
at Almost the First Cost of Iron

WRITING in the Plumbers Trade Journal, Mr. T. N. Thomson, sanitary engineer, compares the sizes of iron and Brass pipe required to carry the same volume of water and presents a table of sizes which, when filled in with prices by the estimator, gives a Brass installation at a cost so little in excess of iron that the difference may be ignored.

To illustrate at a glance the basis for Mr. Thomson's calculations we have prepared the diagram which appears on this page.

Deterioration of iron pipe begins the day it is made and progresses in service until the iron pipe becomes completely clogged with rust.

This corrosion, which is particularly acute in the hot water supply lines, not only discolors the water but greatly reduces or stops delivery at the fixture, and also eats away the pipe wall to such an extent that in many instances leaks



appear within six years and force a renewal of the piping.

On the other hand, Brass pipe delivers at the end of any number of years of service as much water as it does on the day it comes from the mill.

Reprints of Mr. Thomson's article are available upon request to the Association.

Saving in Pipe Size by Use of Brass

From many years' experience on a variety of work, it would appear that reasonable differences in diameter for street service and cold water lines are as follows:

½	inch	Brass	instead of	¾	inch	iron
¾	"	"	"	1	"	"
1	"	"	"	1¼	"	"
1¼	"	"	"	1½	"	"
1½	"	"	"	2	"	"
2	"	"	"	2½	"	"

For hot water lines, the following appear reasonable:

½	inch	Brass	instead of	1	inch	iron
¾	"	"	"	1¼	"	"
1	"	"	"	1½	"	"
1¼	"	"	"	2	"	"
1½	"	"	"	2½	"	"
2	"	"	"	3	"	"

"Copper and Brass are cheaper because you pay for them only ONCE"

COPPER & BRASS
RESEARCH ASSOCIATION
25 Broadway - New York

Rubber Covered Wires and Cables

National Electrical Code Standard

FOR
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PUBLIC BUILDINGS

Complete detail specifications for your files upon request.
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HIGH QUALITY TELEPHONE APPARATUS
For 22 Years

And have developed system arrangements
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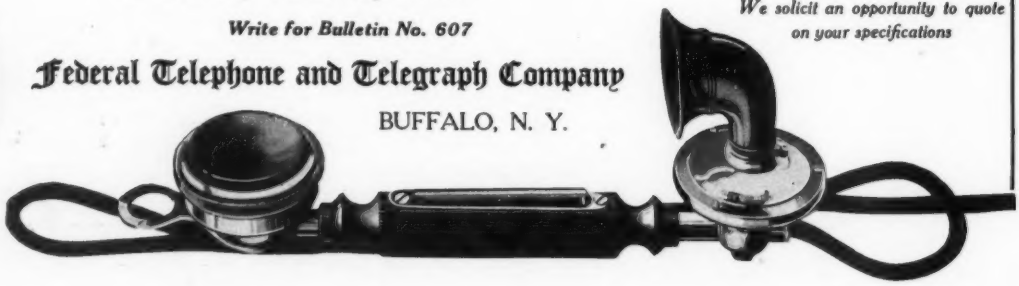
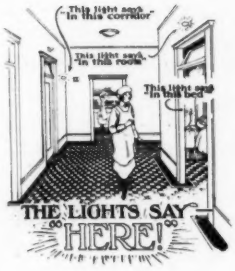
BUFFALO, N. Y.



Masonic Memorial, Utica, N. Y.

R. I. Hospital Providence, R. I.

Fifth Avenue Hospital, New York



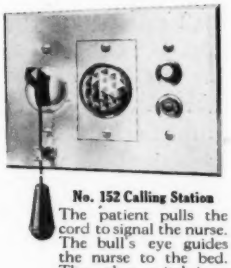
An Index of Satisfactory Performance

WHEN Architects who head their profession prefer and specify the Bryant Silent Call Hospital Signal System there must be good reason for their choice. Such important equipment is chosen only after its real merit has been demonstrated.

There are nearly nineteen thousand Bryant calling stations installed in over four hundred hospitals in America and foreign countries. Hospitals with only four beds have found it an advantage. Hospitals with over five hundred beds find it indispensable.

The Bryant Silent Call Hospital Signal System is simple in construction. It operates on the standard lighting voltage and needs no auxiliaries. It is dependable. It is safe.

The catalog describing it is not only interesting, it is useful. Send for it.



No. 152 Calling Station
The patient pulls the cord to signal the nurse. The bull's eye guides the nurse to the bed. The other switch is to summon a doctor.

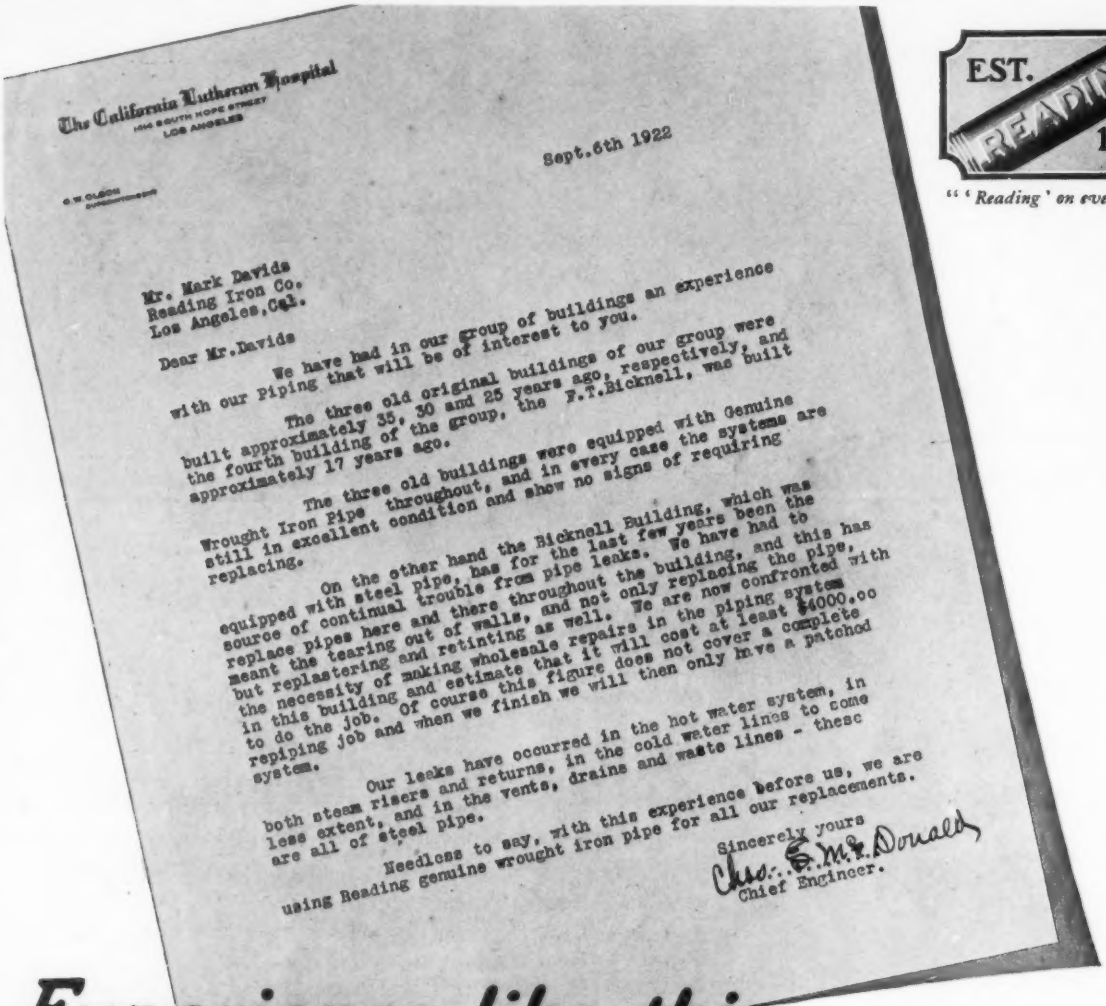
THE BRYANT ELECTRIC COMPANY

BRIDGEPORT, CONNECTICUT

NEW YORK
342 Madison Avenue

CHICAGO
844 West Adams Street

SAN FRANCISCO
149 New Montgomery Street



The California Lutheran Hospital
1414 SOUTH HOPE STREET
LOS ANGELES

Sept.6th 1922

Mr. Mark Davids
Reading Iron Co.
Los Angeles,Cal.

Dear Mr.Davids

We have had in our group of buildings an experience with our Piping that will be of interest to you.

The three old original buildings of our group were built approximately 35, 30 and 25 years ago, respectively, and the fourth building of the group, the F.T.Bicknell, was built approximately 17 years ago.

The three old buildings were equipped with Genuine Wrought Iron Pipe throughout, and in every case the systems are still in excellent condition and show no signs of requiring replacing.

On the other hand the Bicknell Building, which was equipped with steel pipe, has for the last few years been the source of continual trouble from pipe leaks. We have had to replace pipes here and there throughout the building, and this has meant the tearing out of walls, and not only replacing the pipe, but replastering and retinting as well. We are now confronted with the necessity of making wholesale repairs in the piping system in this building and estimate that it will cost at least $4000.00 to do the job. Of course this figure does not cover a complete repiping job and when we finish we will then only have a patched system.

Our leaks have occurred in the hot water system, in both steam risers and returns, in the cold water lines to some less extent, and in the vents, drains and waste lines - these are all of steel pipe.

Needless to say, with this experience before us, we are using Reading genuine wrought iron pipe for all our replacements.

Sincerely yours
Chief Engineer.

EST. READING 1848

"'Reading' on every length"

Experience like this is worth thousands of dollars!

IT has cost the owners of this hospital $4000 to find out that *it pays to use Reading Genuine Wrought Iron Pipe.* It is the result of such experience, *with both makes of pipe working under similar conditions,* that the true value of Reading can be realized. It is a testimonial that is a warning and a guide to owners and architects to see that corrosive-resisting pipe is specified.

Specifications for Genuine Wrought Iron Pipe

ALL black and galvanized pipe and nipples shall be Reading or equally approved genuine wrought iron standard full-weight pipe, made entirely from puddled pig iron, without the admixture of any scrap except crop ends from the pipe itself.

All sizes of pipe should have the manufacturer's name rolled in the metal in raised or depressed letters one or more times on every full length, and certificate as to quality and weight shall be delivered to the architect by the contractor.

Data for your files will be gladly sent

READING IRON COMPANY, Reading, Pa.

Boston New York Philadelphia Baltimore Pittsburgh
Cincinnati Chicago Fort Worth Los Angeles

World's Largest Makers of Genuine Wrought Iron Pipe

READING
GUARANTEED GENUINE
WROUGHT IRON PIPE

Announcing

OVALFLEX

The new flat armored cable

THE National Metal Molding Company, pioneers in the manufacture of electrical conduits and fittings, are prepared to supply a flat armored cable which gives greater freedom in the location of outlets.

From its shape and extreme flexibility the new product has been named OVALFLEX.

OVALFLEX can be laid on brick or tile walls — without chipping or grooving — and covered by the usual thickness of plaster.

By the use of OVALFLEX, outlets can be located on solid walls as well as hollow partitions. Thus electricity may be carried where needed without the previous handicaps in extension wiring.

OVALFLEX makes possible exposed installations that are much more sightly than can be made with round armored cable.

In addition to these and many other exclusive features of OVALFLEX it can be used for any purpose for which round armored cable is suitable.

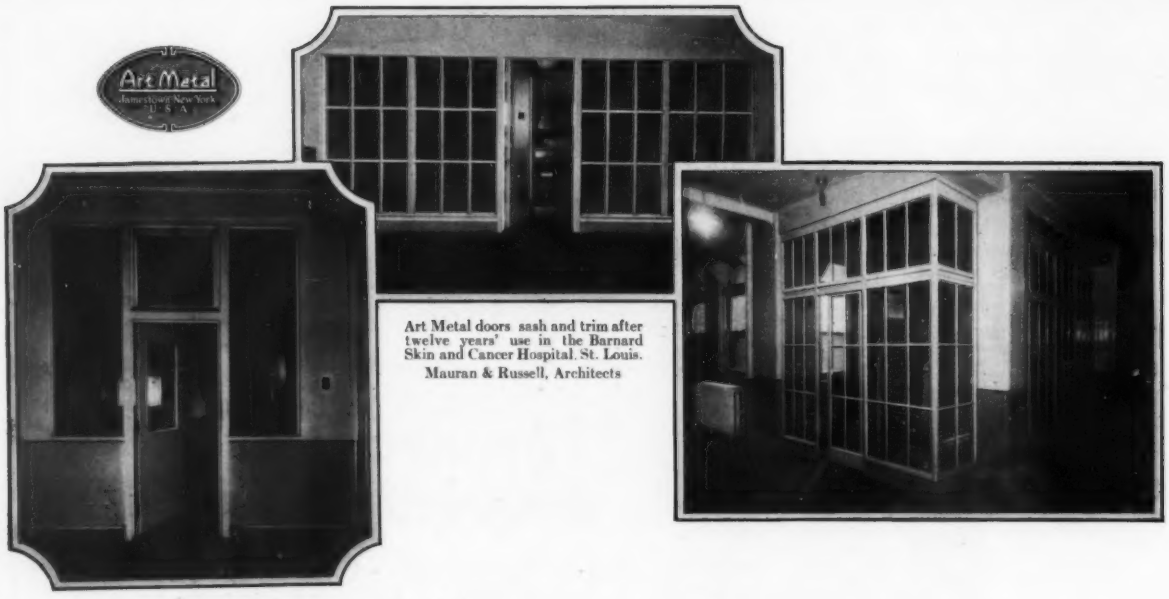
Send for Sample

A sample of OVALFLEX, together with further information, will be sent on request to Architects and Engineers or Electrical Contractors whom they may designate

National Metal Molding Co.

1221 Fulton Building
Pittsburgh, Pa.
Representatives in all principal cities

OVALFLEX was developed and is produced solely by the makers of National Metal Molding, Sherarduct and Economy Conduit, Flextube, Flexsteel, National Brackets, Liberty Rubber Covered Wire and Cable, Outlet Boxes and Fittings



Art Metal doors sash and trim after twelve years' use in the Barnard Skin and Cancer Hospital, St. Louis. Mauran & Russell, Architects

Sanitary, Fire-Resisting, Hollow Metal Doors and Trim for Hospitals

TWELVE years ago Art Metal installed in the Barnard Skin and Cancer Hospital, St. Louis, Mo., a complete equipment of steel doors, sash and trim. The installation consisted of more than one hundred steel doors and trim in addition to the necessary partitions, enclosures and equipment such as electric panel boxes.

Today this equipment is a practical demonstration of what the architect and hospital official may expect in satisfaction and service when Art Metal hollow metal doors and equipment are specified.

The sanitary, baked-on white enamel finish completes the scrupulous cleanliness of the hospital just as the material—steel—completes the fire-resistiveness of the building.

Art Metal offers a complete service in the design and production of architectural hollow metal for all building interiors. Let us supply details and estimates on your next project.

Art Metal

JAMESTOWN, NEW YORK

STEEL AND BRONZE INTERIOR EQUIPMENT FOR BANKS, LIBRARIES, HOSPITALS, SCHOOLS, OFFICE BUILDINGS AND PUBLIC BUILDINGS

BRANCH OFFICES IN ALL PRINCIPAL CITIES

World's largest maker of steel and bronze interior equipment

After the Hospital Is Built "NATIONAL" Pipe Is Rarely Mentioned

Fifth Avenue (General) Hospital, New York City, described in detail in this issue.
York & Sawyer Architects
Meyer, Strong & Jones Con. Engrs.

—but it is highly important to mention it now!

ONCE a hospital, or for that matter any building, is completed, the piping system should be forgotten. And stay forgotten for years to come.

The owners and operating heads of thousands of important buildings throughout the country are seldom reminded that their buildings are piped with "NATIONAL." The architects' original specifications disposed of their piping problems.

No matter where you go, no matter what building type claims your interest, the records of "NATIONAL" pipe in service are as numerous as they are convincing.

A bulletin of special interest to Architects and Hospital officials is available without charge

NATIONAL TUBE COMPANY
PITTSBURGH, PA.

District Sales Offices in the Large Cities

Specialists

(WITH ALL THAT THE WORD IMPLIES)

VENEERED DOORS *FOR* HOSPITALS

A Few Notable Installations

Royal Free Hospital	London, Eng.
Liverpool Royal Infirmary	Liverpool, Eng.
Fifth Ave. Hospital	New York
Mt. Sinai Hospital	New York
St. Luke's Hospital	Chicago
Presbyterian Hospital	Chicago
Children's Hospital	Philadelphia
Massachusetts General Hospital	Boston
Boston City Hospital	Boston
Buffalo City Hospital	Buffalo
Toronto General Hospital	Toronto, Can.
Spokane Hospital	Spokane
St. Vincent's Hospital	Indianapolis
Rhode Island State Hospital	Providence
State Hospital	Worcester, Mass.

and other prominent hospitals throughout the United States, Canada and England

The Compound and Pyrono Door Co.

Factory and General Offices
St. Joseph - Michigan

RELIANCE FIREPROOF PRODUCTS

Auditorium, Mt. Sinai Hospital, New York
Arnold W. Brunner, *Architect* Dr. S. S. Goldwater, *Consultant*

The modern hospital building must give every assurance of sanitation and low maintenance cost. The Mt. Sinai Hospital in its recent buildings has set a standard for hospital design and construction that can be followed with profit by all hospitals. It is significant that in the Administration Building, the Auditorium and the Pathological Building

Reliance Fireproof Products

have been extensively used.

Reliance doors, windows, partitions and trim are absolutely fireproof. Their attractiveness and permanence add that touch of refinement and character always sought for by those architects who seek to combine beauty with utility.

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Brooklyn, N. Y.

Ward, City Hospital, Indianapolis, lighted with X-Ray Eye Comfort Lighting

Photograph showing the lighting in one of the operating rooms of the Edward Hines, Jr. Hospital, Chicago

Comfortable Lighting

For Wards

Comfort is the one service which every hospital must render. Without it, it does not fulfill its purpose. Glaring light irritates the patients and retards recovery. X-Ray Eye Comfort Lighting gives a pleasant, glareless, well diffused light, which adds greatly to the comfort of the patient.

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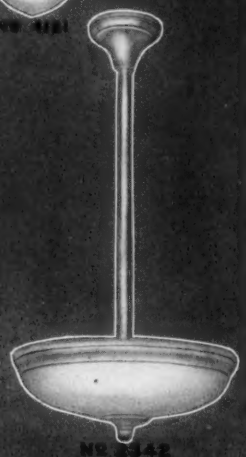
To the Surgeon in the operating room intense, well diffused lighting without shadows is absolutely essential. Our Engineers have successfully solved the problem of lighting the operating room by special fixtures and skylights in the world's largest and most modern hospitals.



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General Conditions without Agreement	.14
Agreement without General Conditions	.05
Bond of Suretyship	.03
Form of Subcontract	.04
Letter of Acceptance of Subcontractor's Proposal	.03
Cover (heavy paper with valuable notes)	.01
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Form of Agreement between Owner and Architect on the Fee Plus Cost System	.05
Circular of Information on Fee Plus Cost System (Owner-Architect)	.03
Form of Agreement between Owner and Contractor (Cost Plus Fee Basis)	.10
Circular of Information on Cost Plus Fee System (Owner-Contractor)	.06

The American Institute recommends, without reservation, the Contract Forms named above. They are recommended to the building industry as a whole, and to the Architectural Profession regardless of Institute affiliation.

The Standard Documents, those listed first, are nationally known and used. Progressive architectural firms are discarding private forms, or local forms, and are incorporating the Institute Documents into their office practice.

All the evidence shows that the building industry is due for a prolonged period of activity. There is hardly an Architect who does not understand the significance of this to the profession as a whole, and to himself individually.

An architectural firm's reputation, based on business ability, is worth much when it becomes established among those who look for it first — the business men of the average American community. Leave no stone unused in making *thorough, incisive, correct* business methods and Contract Forms a part — a habit — of your organization.

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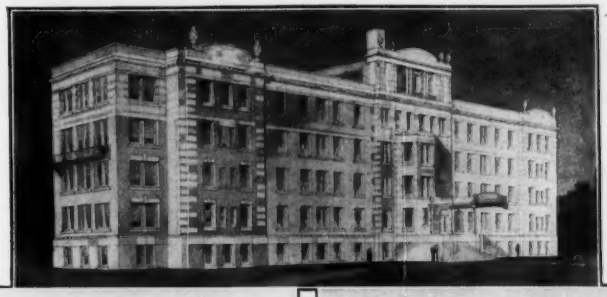

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Plumbing Contractors: Carstens Bros., Ackley, Ia.

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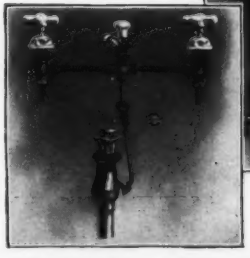

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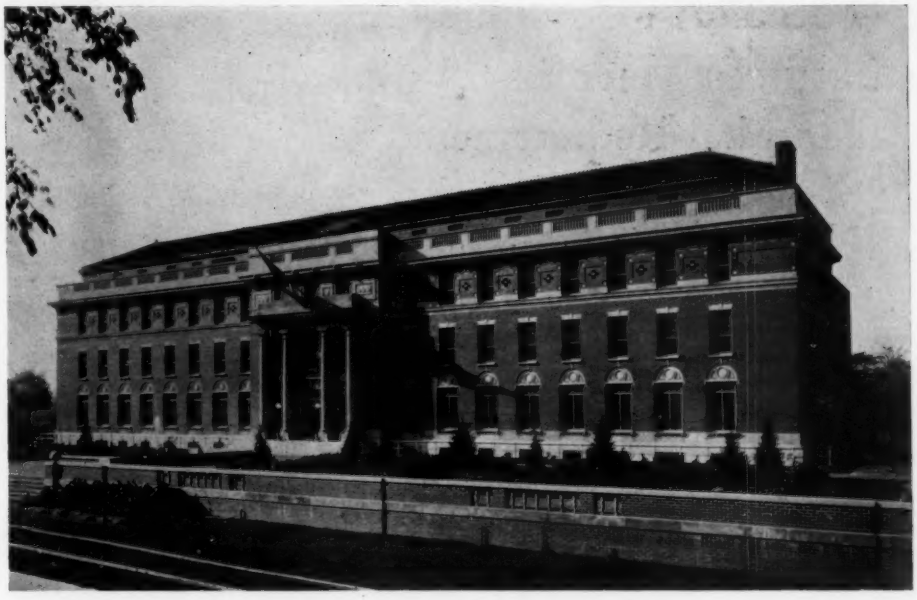

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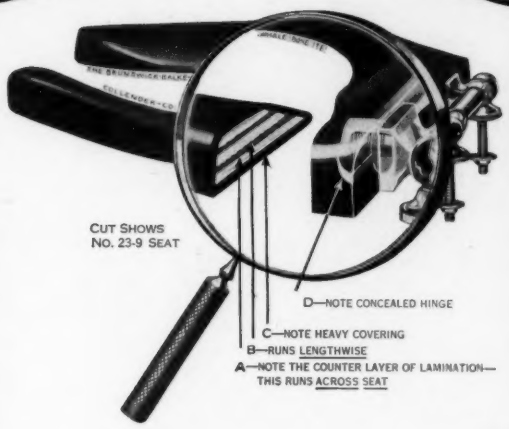

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Seat only. Fits all standard extended lip bowls. Measures 19 inches center hinge posts to front; 15½ inches wide. Hole 8 inches wide.

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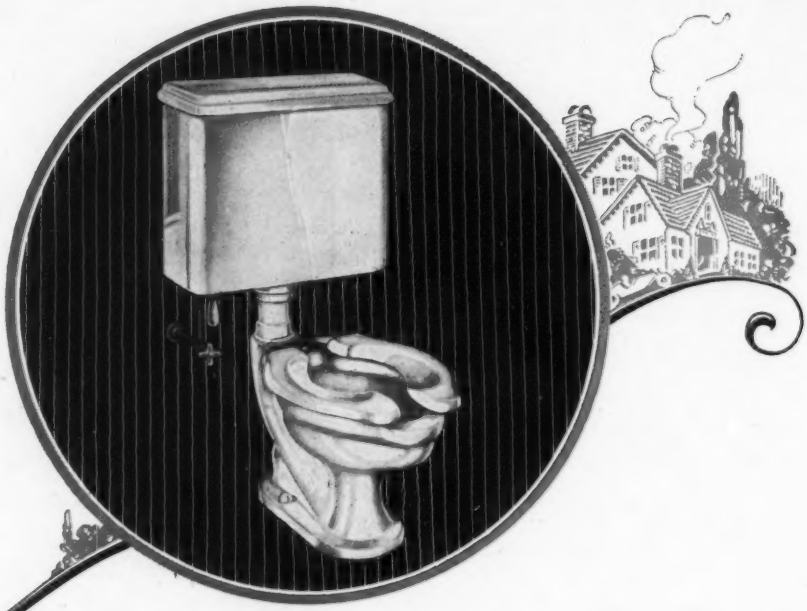

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Vitreous China will outlast any other material from which plumbing fixtures can be made. Hence, doesn't it seem good business to specify Vitreous China fixtures in order that the clients' satisfaction may be LASTING?

SPECIFICATION:

ARISTON H-2900 White Vitreous China Silent Action Syphon Jet Closet, with extended Top Inlet, Floor Outlet and 2-inch Brass Spud. Extended Front Lip and Cut-back Sanitary Rim flushed all the way around. Water surface in bowl to be not less than 14x10-inch. Fitted with White Celluloid-covered Seat, no Cover, Open Front and Back, One-piece Vitreous China Flush Pipe Cover and White Vitreous China Bolt Caps. To be flushed with Madora H-3112 White Vitreous China Low-down Tank and Cover with Under-pull Lever and Maddock guaranteed fittings.

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TRENTON, N. J.

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ECONOMY IN HOSPITAL SANITATION

When a hospital is planned, foresight suggests that sanitation facilities be provided for future as well as immediate needs. Water and drainage systems concealed in walls and beneath floors are accessible only at considerable expense and inconvenience. Economy, therefore, demands the installation of dependable pipe-lines to insure against the necessity for expensive repair work. Piping systems built with Crane equipment outlast fine modern buildings. In quality and endurance, Crane valves and fittings match the convenience afforded by Crane hospital plumbing fixtures.

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Manufacturers' Catalogs and Business Announcements

CATALOG REVIEW

THE HOCKADAY COMPANY, Chicago. "Paint Mileage." 55 pp., 8 x 10½ ins.

Experience has proved that of all the details of a modern building, few if any are more vital to its successful functioning than the treatment of its walls and other portions which require painting. The importance of the subject might be coupled with the fact that comparatively few architects or specification writers really understand the use of paint; a general air of mystery generally prevails regarding the use of the best paint to be specified from a great number and the correct use of what is to be used, so it is not easy to steer a safe course through the mazes of a subject which is widely misunderstood and yet which demands the correct solution of the problem if a really satisfactorily wearing structure is to be delivered to the client.

In this booklet a well known manufacturer of paint presents the case for a material which is made for a great number of purposes and which is being successfully used in a vast number of buildings of widely varying kinds. "Hockaday" is a paint for use on plaster walls of different finishes; on interior woodwork; concrete surfaces of all kinds, including floors; Keene's cement; brick, either hard or soft; wall board, burlap and canvas; metal ceilings; ironwork and hollow tile, and in fact almost any material for interior finish which requires paint which shall wear well. The use of a washable paint is highly desirable in hospitals, schools, hotels and buildings of many other kinds, for since it presents a surface which can be quickly and easily renovated by being merely washed with soap and water, it helps to reduce the costs of maintenance.

In addition to emphasizing the advantages to be desired from the use of this material, "Paint Mileage" contains complete specifications for its use on different surfaces to afford successful results.

INDIANA WORLD WAR MEMORIAL

Notice to Architects

Not later than March 15, 1923, the Board of Trustees of the Indiana World War Memorial will receive at its offices in The Chalfant, N.W. Corner of Pennsylvania and Michigan streets, in the city of Indianapolis, Indiana, competitive "designs, plans and specifications" for a World War Memorial to be erected in the city of Indianapolis, at an approximate cost of $2,000,000.

Full information in regard to the competition may be had by addressing

PAUL COMSTOCK, *Secretary*
The Chalfant, Indianapolis, Indiana

ANNOUNCEMENTS

Louis Andre Lamoreux announces the opening of an office for the practice of architecture at 130 Mohican Bldg., Mansfield, Ohio. Manufacturers' catalogs and samples requested.

The H. H. Winner Company, bank architects and engineers, announces the removal of its offices to the Sharon Bldg., 55 New Montgomery street, San Francisco.

Ralph O. Yeager, architect, announces the opening of an office at 64 E. Van Buren street, Chicago. Manufacturers' samples and catalogs are desired.

Kirby T. Snyder, architect, has removed his office from 1221 Plymouth Bldg. to 3536 Columbus avenue, South, Minneapolis. Manufacturers' samples and catalogs are desired.

Frederic Hutchinson Porter, architect, announces the dissolution of the firm of Baerresen & Porter and his opening of offices at 222 Hynds Bldg., Cheyenne, Wyo. Manufacturers' catalogs and samples are desired.

Leslie A. Libby, architect, announces the removal of his office from 178 Middle street to Falmouth Gardens, Portland, Me.

A. C. Fehlow, architect, has removed his office from 7643 Stewart avenue to 5637 S. Justine street, Chicago.

John N. Marriott announces the removal of his offices from 301 Oppenheimer Bank Bldg. to 1001 Frost National Bank Bldg., San Antonio.

John Scott & Co., architects, have removed their offices from 2326 to 2316 Dime Bank Bldg., Detroit. C. Kenneth Bell, formerly connected with the firm, will continue as associate architect.

Herbert B. Hunter, of Washington, D. C., announces the opening of an office at High Point, N. C., for the general practice of architecture. Manufacturers' samples and catalogs requested.

S. E. Holmes and C. B. Anthony, formerly of the firm of Hatton, Holmes & Anthony, announce the formation of a partnership for the practice of architecture and engineering under the firm name of Holmes-Anthony, with offices at 307 O. R. C. Bldg., Cedar Rapids, Iowa.

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Consulting Engineer

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CONCRETE CONSTRUCTION

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"QUALITY throughout" is the recognized reputation of the Cook County Hospital. The equipment and educational advantages of this institution have made it much sought after by the leading internes from Chicago's medical schools. Here may be found in great variety those special hospital fixtures in Wolff Quality Ware which architects and hospital superintendents are specifying in the latest installations for convenience and time-tested serviceability.

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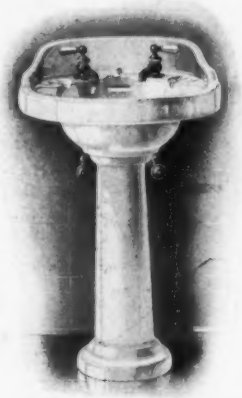
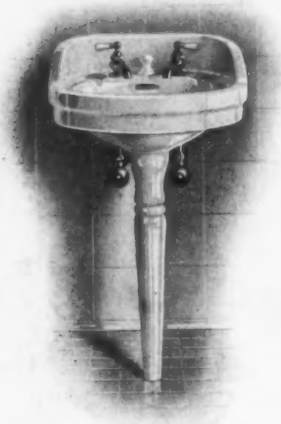


20″ PRINCESS No. 170



18″ x 20″ AINSLEE No. 268

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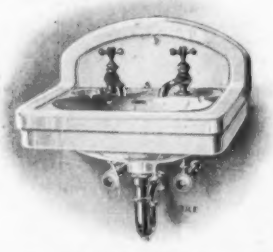

15″ x 18″ LYNDON No. 252

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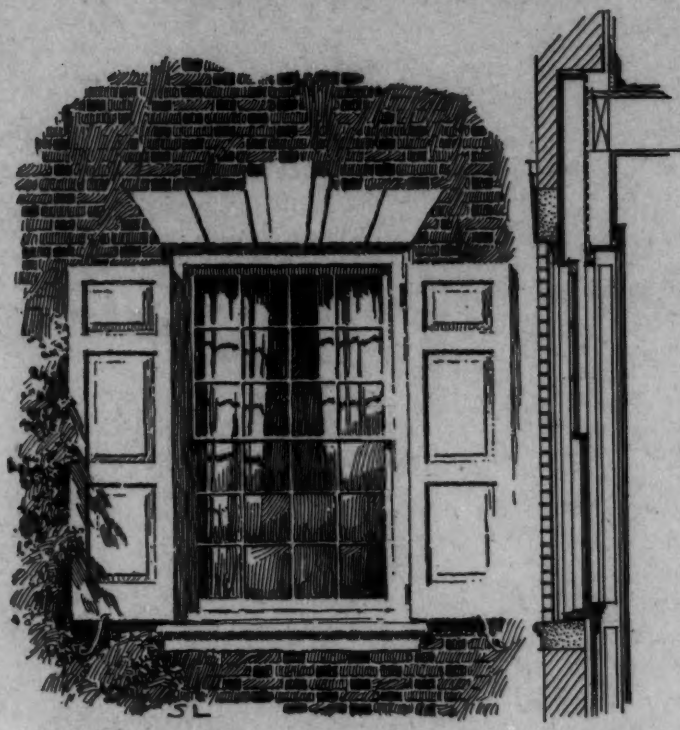

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